

Two-dimensional Shapes and Perimeter



Teacher Guide



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Two-dimensional Shapes and Perimeter

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Two-dimensional Shapes and Perimeter Teacher Guide

Core Knowledge Mathematics™

Unit 7: Two-dimensional Shapes and Perimeter

At a Glance

Unit 7 is estimated to be completed in 17 days.

This unit is divided into four sections including 15 lessons.

- Section A—Reason with Shapes (Lessons 1-5)
- Section B—What is Perimeter? (Lessons 6-9)
- Section C—Expanding on Perimeter (Lessons 10-12)
- Section D—Design with Perimeter and Area (Lessons 13-15)

On pages 9-10 of this Teacher Guide is a chart that identifies the section each lesson belongs in and the materials needed for each lesson.

This unit uses six student centers.

- Can You Draw It?
- How Are They the Same?
- Which One?
- Picture Books
- Compare
- How Close?

Unit 7: Two-dimensional Shapes and Perimeter

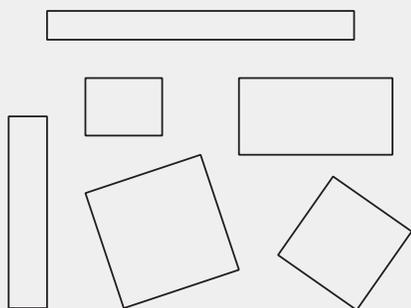
Unit Learning Goals

- Students reason about shapes and their attributes, with a focus on quadrilaterals. They solve problems involving the perimeter and area of shapes.

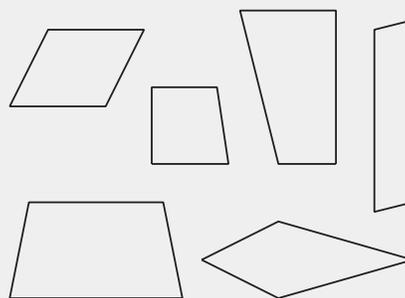
In this unit, students reason about attributes of two-dimensional shapes and learn about perimeter.

Students began to describe, compare, and sort two-dimensional shapes in earlier grades. Here, they continue to do so and to develop language that is increasingly more precise to describe and categorize shapes. Students learn to classify broader categories of shapes (quadrilaterals and triangles) into more specific sub-categories based on their attributes. For instance, they study examples and non-examples of rhombuses, rectangles, and squares, and come to recognize their specific attributes.

These are rectangles.



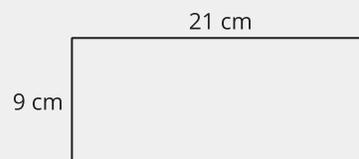
These are not rectangles.



Students also expand their knowledge about attributes that can be measured.

Previously, they learned the meaning of area and found the area of rectangles and figures composed of rectangles. In this unit, students learn the meaning of perimeter and find the perimeter of shapes. They consider geometric attributes of shapes (such as opposite sides having the same length) that can help them find perimeter.

Find the perimeter of this rectangle.



As the lessons progress, they consider situations that involve perimeter, and then those that involve both perimeter and area. These lessons aim to distinguish the two attributes (which are commonly confused) and reinforce that perimeter measures length or distance (in length units) and area measures the amount of space covered by a shape (in square units).

At the end of the unit, students solve problems in a variety of contexts. They apply what they learn about geometric attributes of shapes, perimeter, and area, to design a park, a West African wax print pattern, and a robot. They then solve problems within the context of their design.

Section A: Reason with Shapes

Standards Alignments

Addressing 3.G.A.1, 3.NBT.A.3, 3.OA.C.7

Building Towards 3.G.A.1

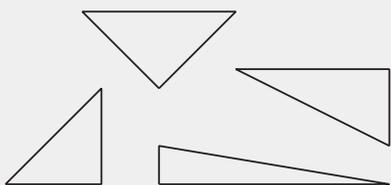
Section Learning Goals

- Reason about shapes and their attributes.

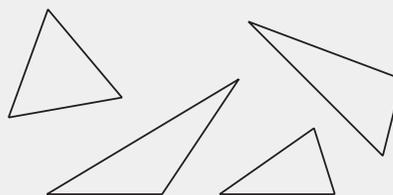
In this section, students describe, compare, and sort a variety of shapes. They have previously used terms such as square, rectangle, triangle, quadrilateral, pentagon, and hexagon to name shapes. Here, students think about ways to further categorize triangles and quadrilaterals. They see that triangles and quadrilaterals can be classified based on their sides (whether some are of equal length) and their angles (whether one or more right angles are present).

Although students will not learn the formal definition of an angle until grade 4, they are introduced to the terms “angle in a shape” and “right angle in a shape” to describe the corners of shapes. This allows students to distinguish right triangles and to describe defining attributes of squares and rectangles.

These are right triangles.



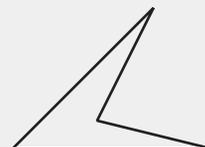
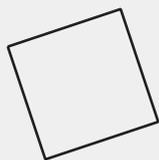
These are not right triangles.



What makes a shape a right triangle?

Students come to understand that a shape can have more than one name if it has the attributes that define different types of shapes. They also see that some quadrilaterals aren't squares, rhombuses, or rectangles because they don't have the defining attributes of these shapes.

For example, here are three quadrilaterals. The first one is a rectangle, a rhombus, and a square. The other two are not squares, rhombuses, or rectangles.



Suggested Centers

- Can You Draw It? (1–5), Stage 2: Grade 2 Shapes (Supporting)
- How Are They the Same? (1–5), Stage 2: Grade 2 Shapes (Supporting)
- Which One? (K–5), Stage 3: Grade 2 Shapes (Supporting)
- Picture Books (K–5), Stage 3: Find Shapes (Addressing)
- Which One? (K–5), Stage 4: Grade 3 Shapes (Addressing)

Section B: What is Perimeter?

Standards Alignments

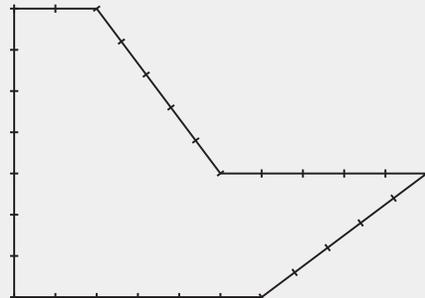
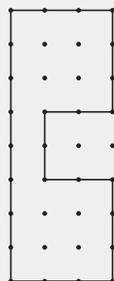
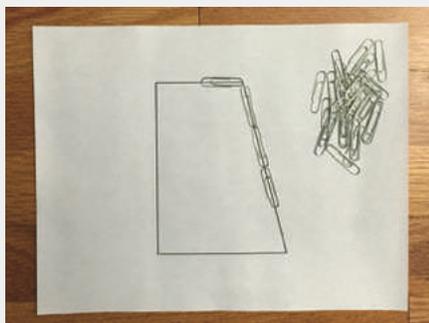
Addressing 3.MD.D, 3.MD.D.8, 3.NBT.A.2, 3.OA.C.7

Building Towards 3.MD.D.8

Section Learning Goals

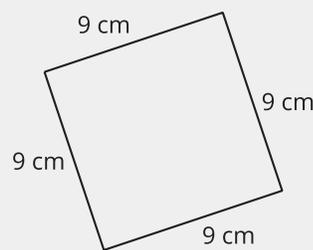
- Find the perimeter of two-dimensional shapes, including when all or some side lengths are given.

In this section, students are introduced to the idea of perimeter. Students begin to conceptualize perimeter as a measurable geometric attribute with a concrete experience: using paper clips to build the boundary of shapes and using the length of a paper clip as the unit for measuring the distance around each shape.



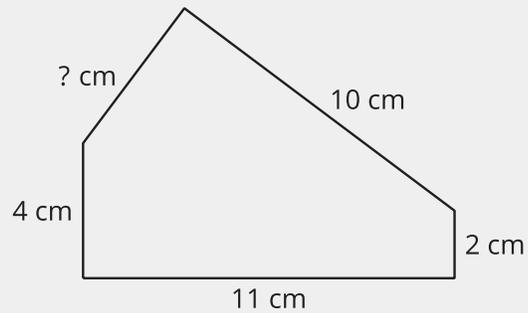
From there, they transition to analyzing shapes with equal-size intervals marked on their sides or shapes drawn on dot paper or grid paper. They quantify the distance around the shape by counting the intervals or adding the number of units on each side.

Later, students find the perimeter of shapes labeled with their side lengths. They learn to leverage the geometric attributes of shapes to find perimeter more efficiently (for instance, by recognizing sides that are the same length and using multiplication).



As they find the perimeter of shapes, students see that different shapes can have the same perimeter and draw shapes with a specified perimeter. Finally, students find missing side lengths of shapes given the perimeter and solve perimeter problems in context.

*This pentagon has a perimeter of 32 cm.
What is the length of the missing side?*



   PLC: Lesson 8, Activity 1, Ways to Find Perimeter

Suggested Centers

- Picture Books (K–5), Stage 3: Find Shapes (Addressing)
- Which One? (K–5), Stage 4: Grade 3 Shapes (Addressing)
- Can You Draw It? (1–5), Stage 3: Grade 3 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 3: Grade 3 Shapes (Addressing)

Section C: Expanding on Perimeter

Standards Alignments

Addressing 3.MD.D.8, 3.OA.C.7, 3.OA.D.8

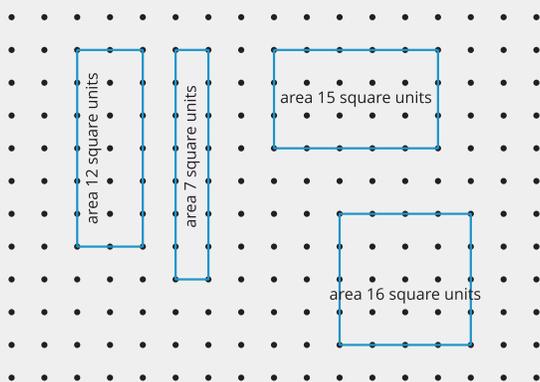
Section Learning Goals

- Solve problems involving perimeter and area, in and out of context.

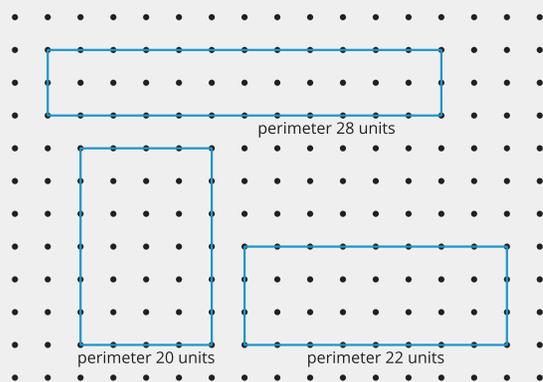
In this section, students analyze the area and perimeter of shapes. They begin by solving contextual problems that require considerations of both measurements. They then draw rectangles with the same perimeter and different areas, and rectangles with the same area and different perimeters.

Students come to see that, given the perimeter of a rectangle, they can find rectangles with different whole-number areas. Likewise, given the area, they can find rectangles with different perimeters.

rectangles with a perimeter of 16 units



rectangles with an area of 24 square units



PLC: Lesson 11, Activity 2, Same Perimeter, Different Area

Suggested Centers

- Can You Draw It? (1–5), Stage 3: Grade 3 Shapes (Addressing)
- Which One? (K–5), Stage 4: Grade 3 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 3: Grade 3 Shapes (Addressing)
- Can You Draw It? (1–5), Stage 4: Area and Perimeter (Addressing)
- Compare (1–5), Stage 4: Divide within 100 (Supporting)
- How Close? (1–5), Stage 5: Multiply to 100 (Supporting)

Section D: Design with Perimeter and Area

Standards Alignments

Addressing 3.G.A.1, 3.MD.D.8

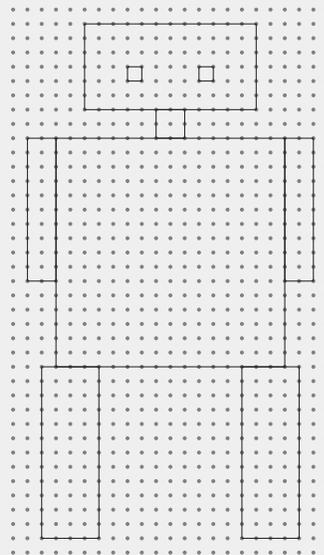
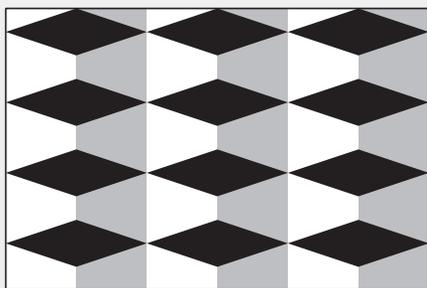
Section Learning Goals

- Apply geometric understanding to solve problems.

In this section, students apply what they've learned about shapes, geometric attributes, perimeter, and area to solve problems and create designs in different contexts.

Students begin by designing a small park with certain features and then finding the area and perimeter of the park. Next, they examine geometric features in West African wax print patterns and then design their own pattern. Finally, students use their knowledge of area and perimeter to create a drawing of a robot whose parts are rectangles with a certain area or perimeter.

Throughout these activities, students draw on dot paper and use the intervals between dots as a unit of measurement.



 ↔  PLC: Lesson 14, Activity 1, Create a Wax Print Pattern

Suggested Centers

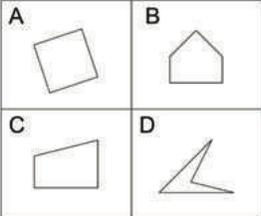
- Can You Draw It? (1–5), Stage 4: Area and Perimeter (Addressing)

- Compare (1–5), Stage 4: Divide within 100 (Supporting)
- How Close? (1–5), Stage 5: Multiply to 100 (Supporting)

Throughout the Unit

The warm-ups throughout the unit are used to address topics within each section and continue to support the fluencies of grade 3. Warm-ups that are not focused on the grade-level fluencies address the learning in the specific sections. In section A, warm-ups focus on using attributes of triangles and quadrilaterals to describe and analyze shapes. In sections B and C, warm-ups focus on perimeter. In the last section, students consider how geometric attributes, perimeter, and area can be used in design.

Here is a sampling of the warm-ups in this unit.

lesson 1	lesson 5	lesson 9	lesson 14
<p>Which One Doesn't Belong?</p> 	<p>Number Talk</p> $70 \div 7$ $77 \div 7$ $63 \div 7$ $56 \div 7$	<p>Estimation Exploration</p>  <p>The larger square base has side lengths of 132 feet each.</p> <p>Estimate the perimeter of the smaller square base.</p>	<p>Notice and Wonder</p> 

Materials Needed

LESSON	GATHER	COPY
A.1	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • Shape Cards Grade 3 (groups of 2)
A.2	<ul style="list-style-type: none"> • Bags or envelopes 	<ul style="list-style-type: none"> • Triangle Cards Grade 3 (groups of 2) • Quadrilateral Cards Grade 3 (groups of 2)
A.3	<ul style="list-style-type: none"> • Counters • Folders • Materials from a previous lesson 	<ul style="list-style-type: none"> • none
A.4	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • none
A.5	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • none
B.6	<ul style="list-style-type: none"> • Paper clips 	<ul style="list-style-type: none"> • What Does It Take to Build the Shapes? (groups of 4)
B.7	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • none
B.8	<ul style="list-style-type: none"> • Tools for creating a visual display 	<ul style="list-style-type: none"> • none
B.9	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • none
C.10	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • Info Gap: A Garden and a Playground (groups of 2)
C.11	<ul style="list-style-type: none"> • Scissors • Tape 	<ul style="list-style-type: none"> • Square Dot Paper Standard (groups of 1)
C.12	<ul style="list-style-type: none"> • Scissors • Tape 	<ul style="list-style-type: none"> • Square Dot Paper Standard (groups of 1)
D.13	<ul style="list-style-type: none"> • none 	<ul style="list-style-type: none"> • Square Dot Paper Standard (groups of 1)
D.14	<ul style="list-style-type: none"> • Colored pencils, crayons, or markers 	<ul style="list-style-type: none"> • Square Dot Paper Standard (groups of 1) • Info Gap: The Bundle (groups of 2)

D.15

- Tape

- Square Dot Paper Standard (groups of 1)

Center: Can You Draw It? (1–5)

Stage 2: Grade 2 Shapes

Lessons

- Grade3.7.A1 (supporting)
- Grade3.7.A2 (supporting)
- Grade3.7.A3 (supporting)

Stage Narrative

Partner A chooses a shape card and describes it to their partner. If Partner B draws the shape correctly, they keep the card. Shape cards include triangles, quadrilaterals, and hexagons.

Standards Alignments

Addressing 2.G.A.1

Materials to Copy

Centimeter Dot Paper - Standard (groups of 1), Shape Cards Grade 2 (groups of 2)

Additional Information

Before playing, remove any cards that do not show a triangle, quadrilateral, or hexagon.

Stage 3: Grade 3 Shapes

Lessons

- Grade3.7.B7 (addressing)
- Grade3.7.B8 (addressing)
- Grade3.7.B9 (addressing)
- Grade3.7.C10 (addressing)

Stage Narrative

Partner A chooses a shape card and describes it to their partner. If Partner B draws the shape correctly, they keep the card. Shape cards include polygons, with a focus on quadrilaterals.

Standards Alignments

Addressing 3.G.A.1

Materials to Copy

Can You Draw It Stage 3 Directions (groups of 2),
Centimeter Grid Paper - Standard (groups of 2),
Quadrilateral Cards Grade 3 (groups of 2), Shape
Cards Grade 3 (groups of 2)

Stage 4: Area and Perimeter

Lessons

- Grade3.7.C11 (addressing)
- Grade3.7.C12 (addressing)
- Grade3.7.D13 (addressing)
- Grade3.7.D14 (addressing)
- Grade3.7.D15 (addressing)

Stage Narrative

Partner A draws a rectangle and tells Partner B either the area or the perimeter of their shape. Partner B tries to draw the rectangle. They earn two points if their rectangle matches the one Partner A drew exactly and one point if it doesn't match exactly, but matches the clue given. This game encourages students to use multiplication fluency to think about rectangles that could be more difficult for their partner to draw.

Standards Alignments

Addressing 3.MD.C, 3.MD.D.8

Materials to Gather

Folders

Materials to Copy

Can You Draw It Stage 4 Recording Sheet (groups of 1)

Stages used in Grade 2

Stage 1

Supporting

- Grade2.6.A

Stage 2

Addressing

- Grade2.6.A
- Grade2.6.B
- Grade2.6.C

Center: How Are They the Same? (1–5)

Stage 2: Grade 2 Shapes

Lessons

- Grade3.7.A1 (supporting)
- Grade3.7.A2 (supporting)
- Grade3.7.A3 (supporting)

Stage Narrative

Students lay six shape cards face up. One student picks two cards that have an attribute in common. All students draw a shape that has a shared attribute with the two shapes. Students get a point if they draw a shape that no other student drew. It is possible that students will draw a shape with a different shared attribute than what the original student chose. This can be an interesting discussion for students to have.

Variation:

Students can write down a shared attribute of the shapes.

Standards Alignments

Addressing 2.G.A.1

Materials to Gather

Paper

Materials to Copy

Shape Cards Grade 2 (groups of 2)

Stage 3: Grade 3 Shapes

Lessons

- Grade3.7.B7 (addressing)
- Grade3.7.B8 (addressing)
- Grade3.7.B9 (addressing)
- Grade3.7.C10 (addressing)

Stage Narrative

Students lay six shape cards face up. One student picks two cards that have an attribute in common. All students draw a shape that has a shared attribute with the two shapes. Students get a point if they draw a shape that no other student drew. It is possible that students will draw a shape with a different shared attribute than what the original student chose. This can be an interesting discussion for students to have.

Variation:

Students can write down a shared attribute of the shapes.

Standards Alignments

Addressing 3.G.A.1

Materials to Gather

Paper

Materials to Copy

Quadrilateral Cards Grade 3 (groups of 2), Shape Cards Grade 3 (groups of 2), Triangle Cards Grade 3 (groups of 2)

Stages used in Grade 2

Stage 2

Addressing

- Grade2.6.B
- Grade2.6.C
- Grade2.6.D

Center: Which One? (K–5)

Stage 3: Grade 2 Shapes

Lessons

- Grade3.7.A1 (supporting)
- Grade3.7.A2 (supporting)
- Grade3.7.A3 (supporting)

Stage Narrative

Students lay out the shape cards face up in rows. One partner chooses a shape. The other partner asks questions to figure out what shape they chose. Students work with triangles, quadrilaterals, and hexagons.

Standards Alignments

Addressing 2.G.A.1

Materials to Copy

Shape Cards Grade 2 (groups of 2)

Stage 4: Grade 3 Shapes

Lessons

- Grade3.7.A4 (addressing)
- Grade3.7.A5 (addressing)
- Grade3.7.B6 (addressing)
- Grade3.7.B8 (addressing)
- Grade3.7.B9 (addressing)
- Grade3.7.C10 (addressing)

Stage Narrative

Students lay out the shape cards face up in rows. One partner chooses a shape. The other partner asks questions to figure out what shape they chose. Students work with polygons, with a focus on quadrilaterals.

Standards Alignments

Addressing 3.G.A.1

Materials to Copy

Quadrilateral Cards Grade 3 (groups of 2), Shape Cards Grade 3 (groups of 2), Triangle Cards Grade 3 (groups of 2)

Stages used in Grade 2

Stage 2

Supporting

- Grade2.6.A

Stage 3

Addressing

- Grade2.6.A
- Grade2.6.B
- Grade2.6.C
- Grade2.6.D

Center: Picture Books (K–5)

Stage 3: Find Shapes

Lessons

- Grade3.7.A4 (addressing)
- Grade3.7.A5 (addressing)
- Grade3.7.B6 (addressing)

Stage Narrative

Students look through picture books and notice and describe shapes they see in the pictures.

Variation:

Students may record the shapes they see with drawings or words.

Standards Alignments

Addressing 1.G.A, 2.G.A, 3.G.A.1, 4.G, 5.G.A, K.G

Materials to Gather

Picture books

Materials to Copy

Picture Books Stage 3 Recording Sheet (groups of 1)

Additional Information

Each group of 2–4 needs at least one picture book that shows a variety of shapes throughout the book.

Stages used in Grade 2

Stage 3

Addressing

- Grade2.6.C
- Grade2.6.D

Center: Compare (1–5)

Stage 4: Divide within 100

Lessons

- Grade3.7.C12 (supporting)
- Grade3.7.D13 (supporting)
- Grade3.7.D14 (supporting)
- Grade3.7.D15 (supporting)

Stage Narrative

Students use cards with division expressions within 100.

This stage of the Compare center is used in grades 3, 4, and 5. When used in grade 3 or 4, remove the cards with two-digit divisors.

Standards Alignments

Addressing 3.OA.C.7

Materials to Copy

Compare Stage 3-8 Directions (groups of 2), Compare Stage 4 Division Cards (groups of 2)

Center: How Close? (1–5)

Stage 5: Multiply to 100

Lessons

- Grade3.7.C12 (supporting)
- Grade3.7.D13 (supporting)
- Grade3.7.D14 (supporting)
- Grade3.7.D15 (supporting)

Stage Narrative

Before playing, students remove the cards that show 10 and set them aside.

Each student picks 4 cards and chooses 2–3 of them to use to create a multiplication expression. Each student multiplies the numbers. The score for the round is the difference between each student's product and 100. Students pick new cards so that they have 4 cards in their hand and then start the next round. The player with the lowest score wins.

Variation:

Students can write the related division equation for each multiplication equation they record.

Standards Alignments

Addressing 3.OA.B.5

Materials to Gather

Number cards 0–10

Materials to Copy

How Close? Stage 5 Recording Sheet (groups of 1)

Stages used in Grade 2

Stage 1

Addressing

- Grade2.1.A
- Grade2.1.B
- Grade2.1.C

Stage 2

Addressing

- Grade2.1.A
- Grade2.1.B
- Grade2.1.C

Stage 3

Addressing

- Grade2.1.A
- Grade2.1.B
- Grade2.1.C

Supporting

- Grade2.4.A
- Grade2.4.B
- Grade2.7.A
- Grade2.7.B

Stage 4

Addressing

- Grade2.7.B
- Grade2.7.C

Supporting

- Grade2.8.A
- Grade2.8.B

Section A: Reason with Shapes

Lesson 1: What Attributes Do You See?

Standards Alignments

Addressing 3.G.A.1

Building Towards 3.G.A.1

Teacher-facing Learning Goals

- Describe attributes of shapes.
- Sort shapes based on attributes in a way that makes sense to them.

Student-facing Learning Goals

- Let's sort shapes into groups.

Lesson Purpose

The purpose of this lesson is for students to sort shapes into categories based on their attributes.

In previous grades, students sorted shapes into categories based on the attributes of the shape. In this lesson, students revisit this work and learn the terms **angle in a shape** and **right angle in a shape** to describe the corners of shapes. This will be helpful in later lessons as students further sort triangles and rectangles by additional attributes. Throughout the lesson, if students have trouble determining if sides have the same length, offer rulers to measure the side lengths.

Access for:

Students with Disabilities

- Representation (Activity 1)

English Learners

- MLR2 (Activity 1)

Instructional Routines

Card Sort (Activity 1), Which One Doesn't Belong? (Warm-up)

Materials to Copy

- Shape Cards Grade 3 (groups of 2): Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	35 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

What part of the lesson went really well today in terms of students' learning? What did you do that made that part go well?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

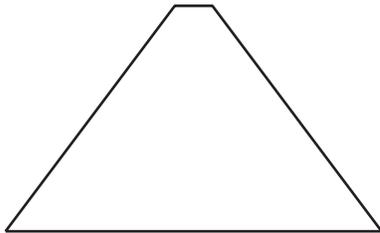
Tell Me About It

Standards Alignments

Addressing 3.G.A.1

Student-facing Task Statement

Select **all** the statements that are true about the shape.



- A. The shape has 3 sides.
- B. The shape has 4 sides.
- C. The shape has 5 sides.
- D. The shape has a right angle.
- E. None of the sides are the same length.
- F. Two of the sides are the same length.
- G. All of the sides are the same length.

Student Responses

B, F

----- **Begin Lesson** -----

Warm-up

🕒 10 min

Which One Doesn't Belong: Who's in the Group?

Standards Alignments

Building Towards 3.G.A.1

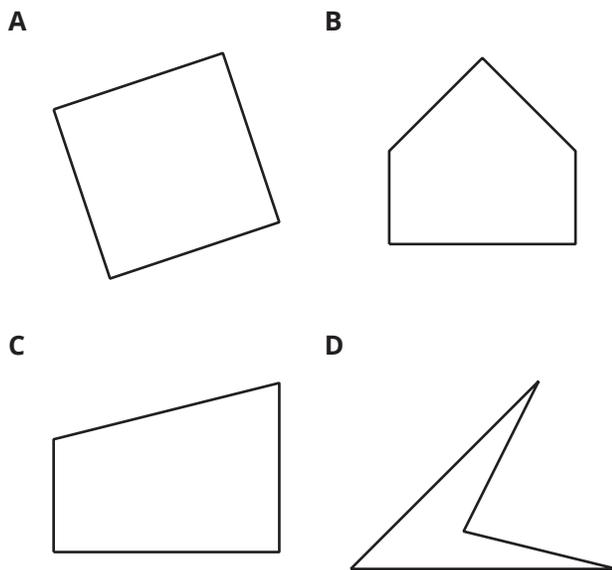
This activity prompts students to compare four shapes. It gives students a reason to use language precisely (MP6). It gives the teacher an opportunity to hear how students use terminology and talk about the characteristics of the items in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as sides, corners, quadrilateral, and pentagon.

Instructional Routines

Which One Doesn't Belong?

Student-facing Task Statement

Which one doesn't belong?



Student Responses

Sample responses:

- A is the only one that doesn't have sides or corners of different sizes.

Launch

- Groups of 2
- Display the image.
- "Pick one that doesn't belong. Be ready to share why it doesn't belong."
- 1 minute: quiet think time

Activity

- "Discuss your thinking with your partner."
- 2-3 minutes: partner discussion
- Share and record responses.

Synthesis

- "Let's find at least one reason why each one doesn't belong."

- B is the only one that doesn't have 4 sides.
- C is the only one that doesn't have sides that are the same length.
- D is the only one whose corners don't all point outward.

Activity 1

🕒 35 min

Card Sort: Shapes

Standards Alignments

Building Towards 3.G.A.1

The purpose of this activity is to encourage students to observe attributes of shapes and use them to sort shapes into groups. When students sort the cards, they look for common attributes or structures shared by different shapes (MP7). Students notice that there are multiple ways to categorize the shapes and that a shape may belong to more than one category depending on the attributes used to sort.

In grade 2, students refer to right angles as square corners. Here, students learn to use the terms **angle in a shape** and **right angle in a shape** to describe the corners of shapes. Note that the term “angle” here is understood informally and used only in reference to shapes and their geometric attributes (for instance, to distinguish rhombuses from squares). Students will not learn the formal definition of an angle—a figure formed by two rays that share an endpoint—or that it is a measurable attribute until grade 4.

When students consider the language they use and revise it to describe a shape in detail or with more specificity, they attend to precision (MP6).

The cards in this activity will be used again in centers.

Access for English Learners

MLR2 Collect and Display. Collect the language students use to sort the cards into categories. Display words and phrases such as: “equal sides,” “equal lengths,” “corners,” “diagonal,” “straight,” “curved,” “slanted,” and “shaded.” During the synthesis, invite students to suggest ways to update the display: “What are some other words or phrases we should include?” etc. Invite students to borrow language from the display as needed.

Advances: Conversing, Reading

Access for Students with Disabilities

Representation: Develop Language and Symbols. Synthesis: Maintain a visible display to record new vocabulary. Invite students to suggest details (words or pictures) that will help them remember the meaning of angle and right angle.

Supports accessibility for: Memory

Instructional Routines

Card Sort

Materials to Copy

Shape Cards Grade 3 (groups of 2)

Required Preparation

- Create a set of cards from the Instructional master for each group of 2.

Student-facing Task Statement

Your teacher will give you a set of cards that show shapes.

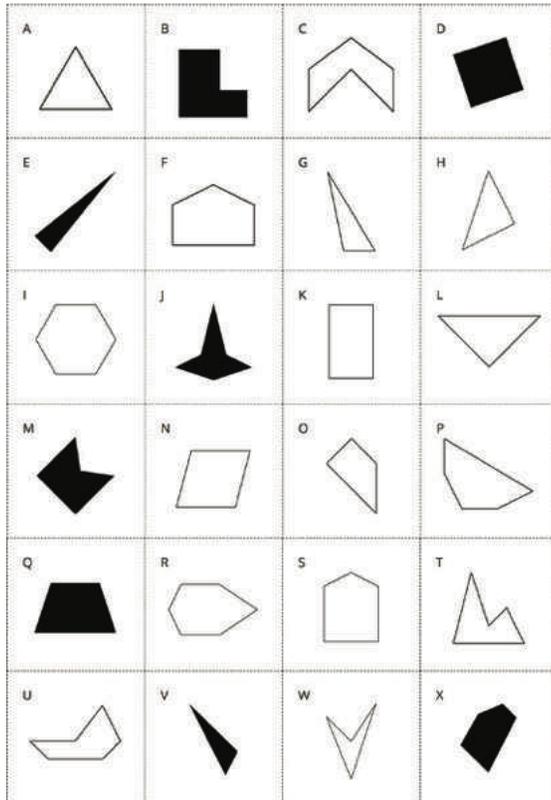
1. Work with your partner to sort the cards into categories. Be prepared to explain your categories.
2. Take turns sorting the cards into two new categories. Don't tell your partner how you sorted them. Your partner will then guess how you sorted your shapes.

Launch

- Groups of 2
- Distribute one set of pre-cut cards to each group of students.
- “What kinds of words do we use to describe shapes?” (sides, corners, flat, curved, diagonal)

Activity

- “In this activity, you will sort some cards into categories in a way that makes sense to you. Work with your partner to come up with categories and then sort the shapes.”



Student Responses

- Students may sort by the number of sides or corners a shape had, or by whether a shape:
 - was shaded
 - had sides of equal length
 - had square corners
 - was resting on a side or on a corner
 - had any corners that point into the shape rather than pointing out
- No response required.

- 8 minutes: partner work time
- Pause for a discussion. Invite groups to share their sorted shapes without naming the categories.
- As each group shares, ask the class to guess the categories and whether others have sorted the same way.
- Record and display the attributes each group used to categorize the shapes (for example: number of sides, length of sides, shading, types of corners).
- "Now, you'll take turns sorting your shapes in a secret way and see if your partner can guess how you sorted your shapes into categories."
- 10 minutes: partner work time

Synthesis

- Invite groups to share any new categories that came up during their partner work time. Record any additional attributes used to sort the shapes.
- "What words or phrases were helpful for describing the shapes?" (four, five, side, corner, length, equal, triangle, square, rectangle, pentagon, hexagon)
- Display card O.
- "The part of the shape where two sides meet is called an **angle in the shape**. How many angles does this shape have?" (Shape O has 4 angles.)
- "This shape also has two special angles. Their sides join in a way that forms a **right angle in the shape**. This is the way the sides join in a square and in rectangles. What other shapes have right angles?" (B, F, M, and S)

Lesson Synthesis

🕒 10 min

“Today we sorted shapes into categories based on their attributes. We saw that a shape could belong in different categories depending on which attribute we use.”

Display cards A and S from the first activity.

“Suppose a student puts A and S in the same category. Which attribute might they have used to sort shapes?” (Length of the sides: A and S have sides with equal length. Size of corners or angles: Both shapes have corners that are the same size. Shading: Neither shape is shaded.)

“Suppose another student puts A and S in different categories. Which attribute might have they used to sort the shapes?” (Right angles: A has none and S has two. Equal sides: All sides of A are equal, but not all sides of S are. Number of sides: A has three, S has five.)

Suggested Centers

- Can You Draw It? (1–5), Stage 2: Grade 2 Shapes (Supporting)
- How Are They the Same? (1–5), Stage 2: Grade 2 Shapes (Supporting)
- Which One? (K–5), Stage 3: Grade 2 Shapes (Supporting)

Complete Cool-Down

Response to Student Thinking

Students choose statements that do not describe the shape.

Next Day Support

- Use the next day's warm-up to have students work in partners to describe one of the shapes in detail.

Lesson 2: Attributes of Triangles and Quadrilaterals

Standards Alignments

Addressing 3.G.A.1, 3.NBT.A.3

Teacher-facing Learning Goals

- Sort triangles and quadrilaterals into subcategories.
- Understand that shared attributes of shapes can define a larger category, such as triangle or quadrilateral.

Student-facing Learning Goals

- Let's sort shapes into more specific categories.

Lesson Purpose

The purpose of this lesson is for students to use attributes of triangles and quadrilaterals to sort them into more specific categories.

In the previous lesson, students learned that shapes could be sorted into more than one category depending on the attributes being considered. In this lesson, they learn that shapes with the same number of sides can be further sorted into subgroups based on other attributes. As students sort triangles and quadrilaterals into subgroups, they focus on attributes other than the number of sides, such as the length of the sides or the number of angles. Throughout the lesson, if students have trouble determining if sides have the same length, offer rulers to measure the side lengths.

The cards in this lesson will be used again in centers.

Access for:

Students with Disabilities

- Representation (Activity 1)

English Learners

- MLR2 (Activity 1)

Instructional Routines

Card Sort (Activity 1, Activity 2), True or False (Warm-up)

Materials to Gather

- Bags or envelopes: Activity 2

Materials to Copy

- Triangle Cards Grade 3 (groups of 2): Activity 1

- Quadrilateral Cards Grade 3 (groups of 2): Activity 2

Lesson Timeline

Warm-up	10 min
Activity 1	15 min
Activity 2	20 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

Today students sorted shapes for different attributes. What strategies for sorting the shapes did you anticipate? Which did you not anticipate?

Cool-down (to be completed at the end of the lesson)

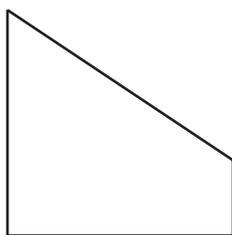
🕒 5 min

Describe the Shape

Standards Alignments

Addressing 3.G.A.1

Student-facing Task Statement



Describe as many attributes of the shape as you can.

Student Responses

Sample response: It's a quadrilateral because it has 4 sides. It has 2 sides the same length. It has 2 right angles. It has 2 sides that go in the same direction.

----- Begin Lesson -----

Warm-up

🕒 10 min

True or False: Multiples of Ten

Standards Alignments

Addressing 3.NBT.A.3

The purpose of this True or False is to elicit strategies students have for multiplying a one-digit number by a multiple of ten. The reasoning students do here helps to deepen their understanding of the properties of operations and develop fluency.

When students use place value or properties of operations as strategies to divide, they look for and make use of structure (MP7).

Instructional Routines

True or False

Student-facing Task Statement

Decide if each statement is true or false. Be prepared to explain your reasoning.

- $3 \times 60 = 9 \times 10$
- $180 = 3 \times 60$
- $6 \times 40 = 24 \times 10$
- $24 \times 10 = 240$

Student Responses

- False: $9 \times 10 = 90$. 2×60 is 120, which is more than 90, so this is false.
- True: I could think of 3×60 as 18×10 , which is 180.
- True: If I decompose 40 into 4×10 , then I can multiply the 6×4 to get 24. I still have to multiply by the 10 so it's 24×10 .
- True: I know that 10×10 is 100. If I double 10, then I have $20 \times 10 = 200$. Four more tens is 40. $200 + 40 = 240$

Launch

- Display one equation.
- “Give me a signal when you know whether the equation is true and can explain how you know.”
- 1 minute: quiet think time

Activity

- Share and record answers and strategy.
- Repeat with each equation.

Synthesis

- “How can you explain your answer without finding the value of both sides?”
- Consider asking:
 - “Who can restate ____’s reasoning in a different way?”
 - “Does anyone want to add on to ____’s reasoning?”

Activity 1

🕒 15 min

Card Sort: Triangles

Standards Alignments

Addressing 3.G.A.1

The purpose of this activity is for students to sort triangles into more specific categories. This requires students to attend to an attribute other than the number of sides. As students sort the triangles, monitor for students who sort by the number of equal side lengths or the presence of a right angle (MP7). Although the terms “equilateral,” “isosceles,” and “scalene” are not introduced in this lesson it is fine if students already know them and use them to describe the groups of triangles.

🌐 Access for English Learners

MLR2 Collect and Display. Direct attention to words collected and displayed from the previous lesson. Invite students to borrow language from the display as needed, and update it throughout the lesson.

Advances: Conversing, Reading

♿ Access for Students with Disabilities

Representation: Access for Perception. Synthesis: Use gestures during explanation of triangle sorting to emphasize side lengths of triangles.

Supports accessibility for: Visual-Spatial Processing

Instructional Routines

Card Sort

Materials to Copy

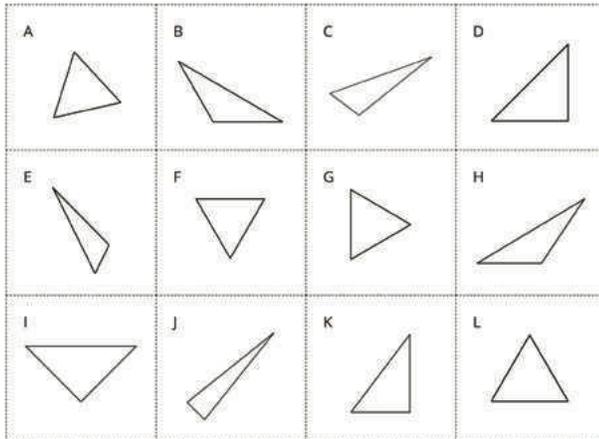
Triangle Cards Grade 3 (groups of 2)

Required Preparation

- Create a set of cards from the Instructional master for each group of 2 or 4.
- When copying the card sort triangles, use colored paper to distinguish these cards from the cards in the next activity.

Student-facing Task Statement

Sort the triangles into categories. Record your categories and be prepared to explain how you sorted the shapes.



Student Responses

Sample responses:

- Number of sides with equal length:
 - all: A, F, G, and L
 - two: B, D, I, and J
 - none: C, E, H, and K
- Presence of right angle:
 - one: I, D, and K
 - none: All the other cards
- Orientation of triangles in cards:
 - resting on a side: B, K, D, H, and L
 - resting on a corner or angle: A, C, E, F, G, I, and J

Launch

- Groups of 2 or 4
- Distribute one set of pre-cut cards to each group of students.
- “What do you notice about the shapes on the cards?” (The shapes are all triangles. They all look different. Some of them have sides that are the same length.)
- 1 minute: quiet think time

Activity

- “Work with your partner to sort the triangles into categories. Be sure to explain your categories.”
- 8 minutes: partner work time
- Monitor for students that sort the triangles into groups based on:
 - the number of sides with equal length (all, two, none)
 - the sides and corners having the same size (the triangles being identical)
 - the presence of right angles

Synthesis

- Select groups to share their categories and how they sorted their cards.
- Allow as many categories to be presented as time permits, but be sure to highlight categories based on the number of sides with equal length.
- Highlight the use of terms like “equal side lengths” and “angles.”
- Record and display the attributes students use to categorize the triangles.

Advancing Student Thinking

If students say they aren't sure how to sort the shapes because they are all triangles, consider asking:

- "What other attributes have you used before to sort shapes?"
- "How are some of the triangles different?"

Activity 2

🕒 20 min

Card Sort: Quadrilaterals

Standards Alignments

Addressing 3.G.A.1

The purpose of this activity is to sort quadrilaterals by their attributes. By now students may be inclined to look for sides of equal lengths and for right angles. They may not look for parallel sides (and are not expected to know the term "parallel"), but may notice that some quadrilaterals have pairs of sides that are oriented in the same direction (MP7). Encourage students to describe such observations in their own words.

The quadrilateral cards from this activity will be used in the next lesson and in centers.

Instructional Routines

Card Sort

Materials to Gather

Bags or envelopes

Materials to Copy

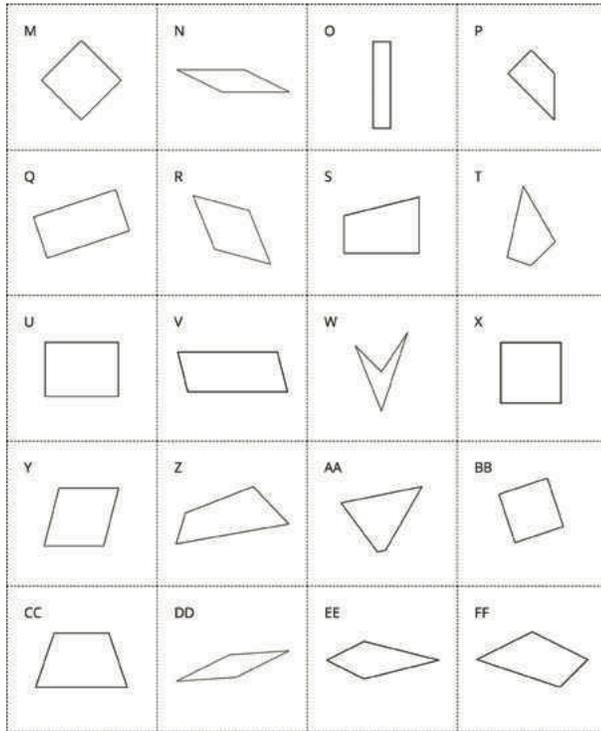
Quadrilateral Cards Grade 3 (groups of 2)

Required Preparation

- Create a set of cards from the Instructional master for each group of 2 or 4.
- Bags or envelopes can be used to store sets of cards from this activity for use in the next lesson.

Student-facing Task Statement

Sort the quadrilaterals into categories. Record your categories and be prepared to explain how you sorted the shapes.



Student Responses

Sample responses:

- Number of sides with equal length:
 - all: M, R, X, Y, BB, and DD
 - two pairs: N, O, Q, U, V, and EE
 - none: P, S, T, W, Z, AA, and FF
- Number of right angles:
 - all: M, O, Q, U, X, and BB
 - two: P and S
 - none: N, R, T, W, Y, Z, AA, CC, DD, EE, FF
- Pairs of sides that go in the same direction:
 - two pairs: M, N, O, Q, R, U, V, X, Y, BB, DD

Launch

- Groups of 2 or 4
- Distribute one set of pre-cut cards to each group of students.
- “What do you notice about the shapes on this set of cards?” (There are 20 shapes. All the shapes are quadrilaterals. Some have right angles and some don’t.)
- 1 minute: quiet think time

Activity

- “Just like the last activity, sort cards into categories that you and your partner choose.”
- 8 minutes: partner work time
- Monitor for different attributes that students use to sort the shapes.

Synthesis

- “Display your sorted cards so that others can see them.”
- “Visit another group’s cards and see if you can figure out how they sorted their quadrilaterals. Be prepared to share your reasoning.”
- 2–3 minutes: Students visit other groups’ displays.
- Invite each group to share how the cards were sorted and their reasoning. Record and display the attributes students use to categorize the quadrilaterals.
- Attend to the language that students use to describe the categories and shapes, giving them opportunities to describe the shapes more precisely.
- Highlight the use of terms like “equal sides” and “right angles.”

- one pair: P, S, AA, CC
- none: T, W, Z, EE, FF

Lesson Synthesis

🕒 10 min

“Today we sorted triangles and quadrilaterals into more-specific categories.”

Display the two compiled lists of attributes used to sort triangles and quadrilaterals.

“Which attributes did we use to sort both sets of shapes?” (The number of sides of the same length. The number of right angles. Whether there were pairs of sides that go in the same direction.)

“Which attributes did we use for one set of shapes but not the other? Why might that be?” (In quadrilaterals we counted the number of right angles, but in triangles we just sorted by whether they had one or not. This is because triangles could only have 1 right angle. We looked at pairs of sides that go in the same direction when sorting quadrilaterals but not when sorting triangles. The sides of triangles can’t go in the same direction.)

Suggested Centers

- Can You Draw It? (1–5), Stage 2: Grade 2 Shapes (Supporting)
- How Are They the Same? (1–5), Stage 2: Grade 2 Shapes (Supporting)
- Which One? (K–5), Stage 3: Grade 2 Shapes (Supporting)

Complete Cool-Down

Response to Student Thinking

Students only describe the number of sides the shape has.

Next Day Support

- During the launch of the next day’s activity, pass back the cool-down and discuss how the shape could be described in more detail.

Lesson 3: Attributes that Define Shapes

Standards Alignments

Addressing 3.G.A.1, 3.NBT.A.3

Teacher-facing Learning Goals

- Describe and identify shapes using their distinguishing attributes.

Student-facing Learning Goals

- Let's play Mystery Quadrilateral.

Lesson Purpose

The purpose of this lesson is for students to describe geometric attributes of shapes.

Students ask yes or no questions about geometric attributes to identify a “mystery quadrilateral.” Students will need their quadrilateral cards from the previous lesson to hide in the mystery quadrilateral folder and will have access to the quadrilaterals in their workbook to support them in questioning, guessing, and ruling out quadrilaterals in the table. Also, it may be helpful to provide counters that students can use to cover quadrilaterals that they rule out with their questioning.

Access for:

Students with Disabilities

- Engagement (Activity 2)

English Learners

- MLR8 (Activity 2)

Instructional Routines

Number Talk (Warm-up)

Materials to Gather

- Counters: Activity 2
- Folders: Activity 2
- Materials from a previous lesson: Activity 1, Activity 2

Lesson Timeline

Warm-up 10 min

Teacher Reflection Question

Identify who participated in math class today. What assumptions are you making about those

Activity 1	10 min	who did not participate?
Activity 2	25 min	
Lesson Synthesis	10 min	
Cool-down	5 min	

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Mystery Shape

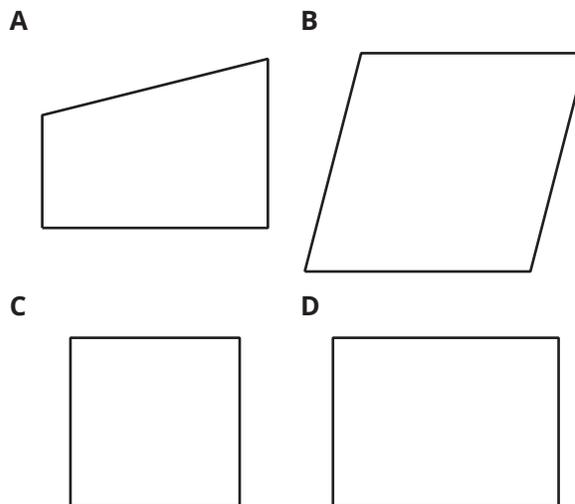
Standards Alignments

Addressing 3.G.A.1

Student-facing Task Statement

1. Which quadrilateral is being described?

- Hint 1: It has 4 sides.
- Hint 2: All of its sides are the same length.
- Hint 3: It has no right angles.



2. Which hints do you need to guess the quadrilateral? Explain your reasoning.

Student Responses

1. B
2. Sample responses:
 - Hints 2 and 3, because Hint 2 tells you that they have sides that are the same length

which gets rid of A and D. Then, Hint 3 tells you that there are no right angles which gets rid of C.

- You only need Hint 3 because B is the only shape with no right angles.

----- Begin Lesson -----

Warm-up

🕒 10 min

Number Talk: Multiply Multiples of Ten

Standards Alignments

Addressing 3.NBT.A.3

This Number Talk prompts students to use place value and properties of operations to multiply single-digit numbers by multiples of ten. The strategies elicited here help students develop fluency.

Instructional Routines

Number Talk

Student-facing Task Statement

Find the value of each expression mentally.

- 4×40
- 8×40
- 7×40
- 9×40

Student Responses

- 160: I know 4×4 is 16, so 4×40 is 16 tens or 16×10 , which is 160.
- 320: I know 8×40 is twice 4×40 , so it's twice 160, which is 320.
- 280: I know that $7 \times 4 = 28$, so this would be

Launch

- Display one expression.
- "Give me a signal when you have an answer and can explain how you got it."
- 1 minute: quiet think time

Activity

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

Synthesis

- "How were you able to use 4×40 to find the

28 tens, which is 280.

- 360: This would be two more forties than 7×40 , so I just counted 280, 320, 360.

other products." (I doubled 4×40 to find 8×40 . Once I knew 4×40 , I could count up or down by 40 to get the other products.)

- Consider asking: "Why might it be helpful to first think of each expressions as multiplying a number and 4 instead of 40?" (We know many multiplication facts for 4, and that 40 is 4 tens. We can think of each problem as groups of 4 tens instead of groups of 40.)

Activity 1

🕒 10 min

Learn How to Play Mystery Quadrilateral

Standards Alignments

Addressing 3.G.A.1

The purpose of this activity is to introduce the game Mystery Quadrilateral and strategically consider the questions that could be asked next to determine a mystery quadrilateral. Students play a round of this game against the teacher. In the next activity, students will play this game in groups of 2.

Materials to Gather

Materials from a previous lesson

Required Preparation

- Gather a set of quadrilateral cards from the previous lesson.

Student-facing Task Statement

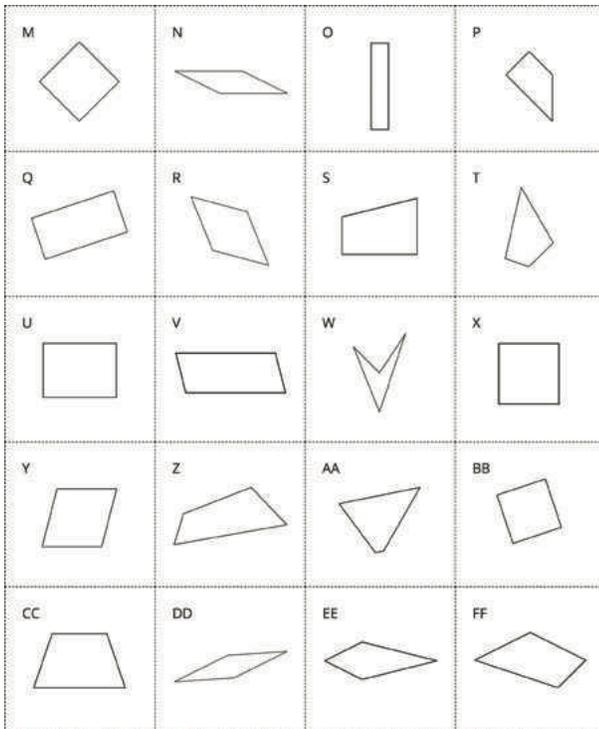
Play a round of Mystery Quadrilateral with your teacher.

1. Partner A: Choose a shape from the group of quadrilaterals. Place it in the mystery quadrilateral folder without your partner seeing it.

Launch

- "We are going to play a game called Mystery Quadrilateral. Read the directions independently."
- 1 minute: quiet think time

2. Partner B: Ask up to 5 “yes” or “no” questions to identify the quadrilateral. Then guess which quadrilateral is the mystery quadrilateral.
3. Partner A: Show your partner the mystery quadrilateral.
4. Switch roles and play again.



Student Responses

No response required.

Activity

- “Now let’s play a round together. I’ll be Partner A and the class will be Partner B.”
- Play a round of the game.

Synthesis

- “What kinds of questions might help you figure out the mystery quadrilateral?” (Questions about something we didn’t already know about the shape. General questions to narrow down the type of quadrilateral, then more-specific questions to figure out which one.)

Activity 2

🕒 25 min

Play Mystery Quadrilateral

Standards Alignments

Addressing 3.G.A.1

The purpose of this activity is for students to practice describing geometric attributes of a quadrilateral with increasing precision by playing a game. Students should be encouraged to ask questions like, “Are all the sides the same length?” rather than, “Is it a square?” to keep the focus on attributes of the quadrilateral rather than the name. As students decide which questions to ask they think about important attributes such as side lengths and angles and have an opportunity to use language precisely (MP6, MP7).

Students will use the quadrilaterals from the previous lesson to hide in the “mystery quadrilateral” folder, but will have a copy of all the shapes in their workbook to support them in asking questions to narrow down the shape. Students can also cover shapes in their workbook with counters as they rule out shapes.

Access for English Learners

MLR8 Discussion Supports. Synthesis: Think aloud and use gestures to emphasize the attributes that students use to describe the shapes. For example, trace your finger along the angles and sides of the shape as students describe them.

Advances: Listening, Representing

Access for Students with Disabilities

Engagement: Develop Effort and Persistence. Check in and provide each group with feedback that encourages collaboration and community.

Supports accessibility for: Social-Emotional Functioning

Materials to Gather

Counters, Folders, Materials from a previous lesson

Required Preparation

- Each group of 2 needs a set of quadrilateral cards from the previous lesson.
- Each group of 2 will need a folder to hide the card during this activity.

Student-facing Task Statement

1. Partner A: Choose a shape from the group of quadrilaterals. Place it in the mystery quadrilateral folder without your partner seeing it.
2. Partner B: Ask up to 5 “yes” or “no” questions to identify the quadrilateral. Then

Launch

- Groups of 2
- “Now you’re going to play Mystery Quadrilateral with your partner. Re-read the directions for the game, then think about some words that may be helpful as you play.” (side, angle, right angle, equal,

guess which quadrilateral is the mystery quadrilateral.

3. Partner A: Show your partner the mystery quadrilateral.
4. Switch roles and play again.

Student Responses

No response required.

skinny, tall, slanted)

- 1 minute: quiet think time
- Share and record responses.
- Give each group a folder containing a set of the quadrilateral cards from the previous lesson.
- “How could you use the images of all the quadrilaterals on your paper as you play?” (They can help me think about questions I could ask. I could mark off quadrilaterals as I figure out that they're not the mystery quadrilateral.)
- Give students access to counters and let them know they can be used to cover shapes they want to cross out during the game.

Activity

- “Play Mystery Quadrilateral with your partner. Be sure to take turns hiding the shape and guessing the shape.”
- 10–15 minutes: partner work time

Synthesis

- “What shapes were the easiest to figure out and why?” (W was easy because it was so different with one angle pointing in. X was easy because it was the only square resting on a side.)
- “What shapes were the most challenging to ask questions about and why?” (FF was challenging because none of the sides were the same length, and it was hard to get more information with “yes” or “no” questions. M and BB were hard to tell apart because they were so similar and it was hard to figure out what questions to ask.)

Lesson Synthesis

🕒 10 min

Display cards S, U, and X.

“Here are some quadrilaterals that are the same in some ways. What attributes would you use to describe how they’re different?” (I would focus on the number of sides that are the same length. I would focus on the number of right angles they have.)

Suggested Centers

- Can You Draw It? (1–5), Stage 2: Grade 2 Shapes (Supporting)
- How Are They the Same? (1–5), Stage 2: Grade 2 Shapes (Supporting)
- Which One? (K–5), Stage 3: Grade 2 Shapes (Supporting)

Complete Cool-Down

Response to Student Thinking

Students choose a quadrilateral that isn’t described by all of the hints.

Next Day Support

- Before the warm-up, have students work in partners to discuss a correct response to this cool-down.

Lesson 4: Attributes of Rectangles, Rhombuses, and Squares

Standards Alignments

Addressing 3.G.A.1

Teacher-facing Learning Goals

- Identify attributes of rhombuses, rectangles, and squares.

Student-facing Learning Goals

- Let's find out what makes rectangles, rhombuses, and squares what they are.

Lesson Purpose

The purpose of this lesson is for students to consider the geometric attributes a quadrilateral must have to be a rhombus, rectangle, or square.

In previous lessons, students learned how to compare and describe shapes using geometric attributes. In this lesson, students analyze examples and non-examples of rectangles, rhombuses, and squares in order to identify their defining attributes. As they discern and describe features that define these quadrilaterals, students practice looking for structure (MP7) and communicating with precision (MP6).

Throughout the lesson, offer rulers to students if needed to determine if sides have the same length.

Access for:

Students with Disabilities

- Engagement (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Which One Doesn't Belong? (Warm-up)

Lesson Timeline

Warm-up	10 min
Activity 1	35 min
Lesson Synthesis	10 min

Teacher Reflection Question

Today students carefully analyzed attributes of specific quadrilaterals. How did this work prepare them to see a square as both a rhombus and a rectangle in future lessons?

Cool-down

5 min

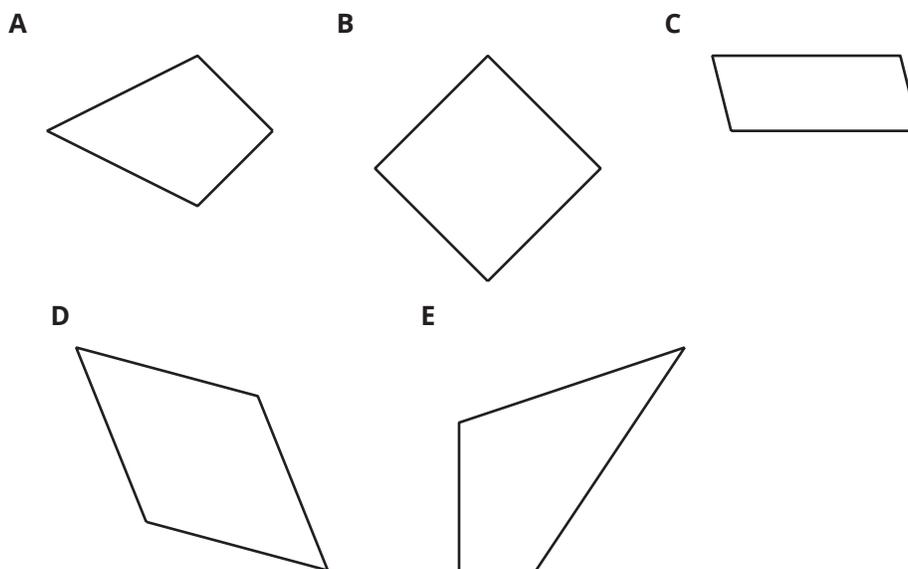
Cool-down (to be completed at the end of the lesson)

🕒 5 min

Find the Rhombuses

Standards Alignments

Addressing 3.G.A.1

Student-facing Task StatementSelect **all** of the quadrilaterals that are rhombuses. Explain your reasoning.**Student Responses**

B and D, because they have 4 sides and all the sides are the same length.

----- **Begin Lesson** -----**Warm-up**

🕒 10 min

Which One Doesn't Belong: More Attributes

Standards Alignments

Addressing 3.G.A.1

This warm-up prompts students to compare four shapes. It gives students a reason to use language precisely (MP6). It gives the teacher an opportunity to hear how students use terminology and talk about the characteristics of the items in comparison to one another. During the synthesis, emphasize that three of the shapes are quadrilaterals, even though they look very different.

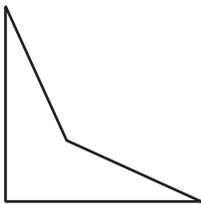
Instructional Routines

Which One Doesn't Belong?

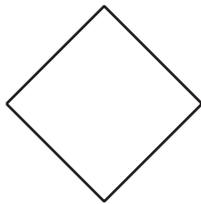
Student-facing Task Statement

Which one doesn't belong?

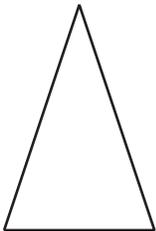
A



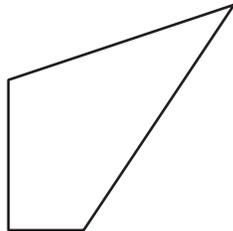
B



C



D



Student Responses

Sample responses:

- A is the only one whose corners don't all point outward.
- B is the only one without varying side lengths.
- C is the only one that doesn't have 4 sides or any right angles.
- D is the only one without sides of the same length.

Launch

- Groups of 2
- Display the images.
- "Pick one that doesn't belong. Be ready to share why it doesn't belong."
- 1 minute: quiet think time

Activity

- "Discuss your thinking with your partner."
- 2-3 minutes: partner discussion
- Share and record responses.

Synthesis

- "Which shapes are quadrilaterals? How do you know?" (A, B, and D. They all have four sides.)
- "Let's find at least one reason why each one doesn't belong."

Activity 1

🕒 35 min

What Makes These Shapes So?

👤 ↔ 👤 PLC Activity

Standards Alignments

Addressing 3.G.A.1

The purpose of this activity is for students to identify the attributes that make a quadrilateral a rectangle, a rhombus, or a square. They do so by studying examples and non-examples, looking for features that each set has in common and drawing conclusions accordingly (MP7). The goal is not to craft the most precise definition for each, but to develop an understanding of the defining geometric attributes.

🌐 Access for English Learners

MLR8 Discussion Supports. Display sentence frames to support small-group discussion: “I notice ____ so I think . . .”, “____ and ____ are the same/alike because . . .”, “____ and ____ are different because . . .”

Advances: Conversing, Representing

♿ Access for Students with Disabilities

Engagement: Provide Access by Recruiting Interest. Optimize meaning and value. Invite students to share, with a partner, the attributes needed in order to be an example of this type of quadrilateral.

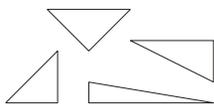
Supports accessibility for: Social-Emotional Functioning, Attention

Required Preparation

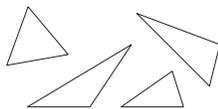
- Create a chart with labels showing a rectangle, rhombus, and square for the lesson synthesis.

Student-facing Task Statement

1. These are right triangles.



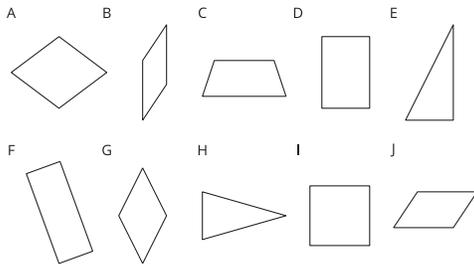
These are not right triangles.



Launch

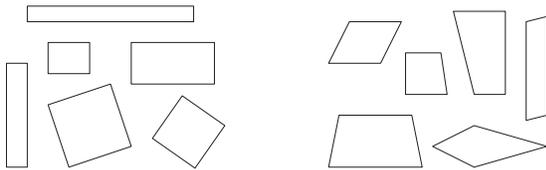
- Groups of 2–3
- Display the examples and non-examples of right triangles.
- “The triangles on the left are right triangles. The ones on the right are not. Take a minute to think about their differences.”

- a. Which of the following are right triangles? Circle them.

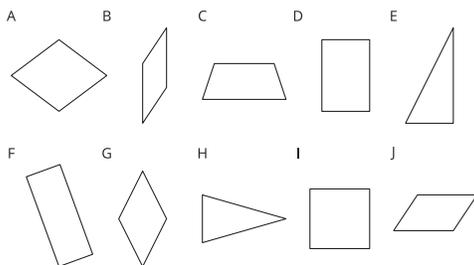


- b. What makes a shape a right triangle?

2. These are rectangles. These are not rectangles.

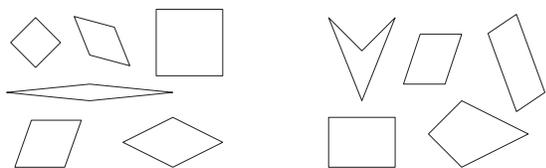


- a. Which of the following are rectangles? Circle them.



- b. What makes a shape a rectangle?

3. These are rhombuses. These are not rhombuses.



- a. Which of the following are rhombuses? Circle them.

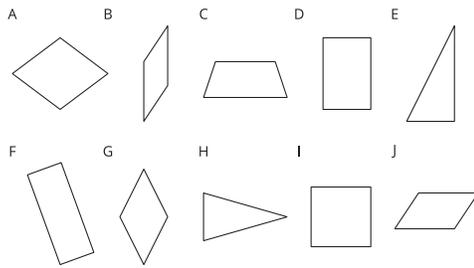
- “Then, choose all the shapes that are right triangles from the set labeled A–H. Write down what you think makes a shape a right triangle.”
- 1–2 minutes: quiet think time
- 1–2 minutes: partner discussion
- Share responses.
- “All triangles on the left and triangle E in the set are right angles. A triangle with a right angle is a right triangle.”

Activity

- “Work with your group to analyze what makes a shape a rectangle, a rhombus, or a square. Each group will look at one type of quadrilateral.”
- Assign each group one quadrilateral to analyze.
- 3–5 minutes: small-group work time
- “Now, share your work with another group that worked on the same quadrilateral. Be sure to ask any questions you have about each other’s work.”
- 3–5 minutes: small-group discussion

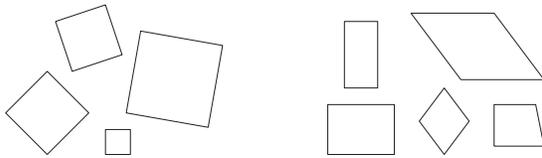
Synthesis

- Invite 1–2 groups who analyzed rectangles to share their responses. Record their responses.
- Ask the class:
 - “Do you agree with the shapes that are marked as rectangles (or rhombuses or squares)?”
 - “Do you agree with the descriptions?”
 - “Is there any part of the descriptions you’d say differently?”
 - “Is there anything you’d add to the description?”

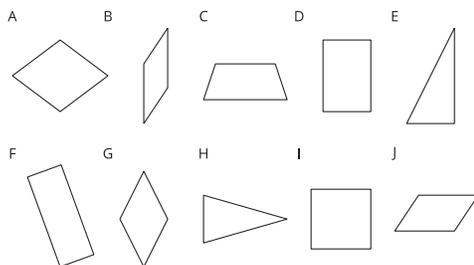


b. What makes a shape a rhombus?

4. These are These are not
 squares. squares.



a. Which of the following are squares?
Circle them.



b. What makes a shape a square?

- When students have finished describing rectangles, highlight that: "A shape is a rectangle only if it is a quadrilateral with only right angles, and the sides that are across from each other are the same length."
- Repeat the discussion with rhombuses and squares.

Student Responses

Sample responses:

- a. E is a right triangle.
 - b. A triangle with a right angle
- a. D, F, and I are rectangles.
 - b. A quadrilateral with 4 right angles and 2 pairs of sides the same length. Each pair of sides across from one another are the same length.
- a. A, G, I are rhombuses.

- b. A quadrilateral with all the sides having the same length
4.
 - a. I is a square.
 - b. A quadrilateral with all same-length sides and all angles being right angles

Lesson Synthesis

⌚ 10 min

Display a poster with a labeled rhombus, rectangle, and square.

“Today we learned about the attributes of each one of these quadrilaterals.”

“What are the important attributes of each quadrilateral?” (Rhombuses have sides that are all the same length. Rectangles have sides across from each other that are equal and all the angles are right angles. All the sides are equal and all the angles are right angles in a square.)

Record responses on the poster.

“How are these quadrilaterals alike? How are they different?” (All three of them have 4 sides. The square and the rhombus both have sides that are all the same length. The square and the rectangle both have right angles.)

Suggested Centers

- Picture Books (K–5), Stage 3: Find Shapes (Addressing)
- Which One? (K–5), Stage 4: Grade 3 Shapes (Addressing)

Complete Cool-Down

Response to Student Thinking

Students choose quadrilaterals that are not rhombuses.

Next Day Support

- During the launch of the next day’s activity, highlight important ideas from the previous lesson.

Lesson 5: Attributes of Other Quadrilaterals

Standards Alignments

Addressing 3.G.A.1, 3.OA.C.7

Teacher-facing Learning Goals

- Draw examples of quadrilaterals that are not rhombuses, rectangles, or squares.
- Understand that shapes can be in more than one category.

Student-facing Learning Goals

- Let's describe and draw shapes in specific groups.

Lesson Purpose

The purpose of this lesson is for students to use their knowledge of geometric attributes to name quadrilaterals in different ways and to draw quadrilaterals that are not rhombuses, rectangles, or squares.

In previous lessons, students learned the defining attributes of a rhombus, a rectangle, and a square. In this lesson, students apply that knowledge to name quadrilaterals in multiple ways and to draw quadrilaterals that are not rhombuses, rectangles, or squares.

Throughout the lesson, offer rulers to students if needed to determine if sides have the same length.

This lesson has a Student Section Summary.

Access for:

Students with Disabilities

- Engagement (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Number Talk (Warm-up)

Lesson Timeline

Warm-up	10 min
Activity 1	20 min

Teacher Reflection Question

What surprised you about student thinking as they drew quadrilaterals that were not rectangles, rhombuses, or squares?

Activity 2	15 min
Lesson Synthesis	10 min
Cool-down	5 min

Cool-down (to be completed at the end of the lesson)

🕒 5 min

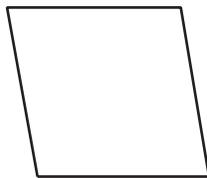
Describe It, Draw It

Standards Alignments

Addressing 3.G.A.1

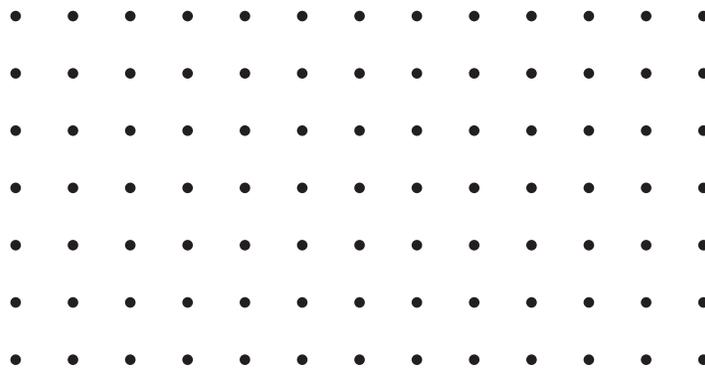
Student-facing Task Statement

1. Select **all** the ways you could name this shape. Explain your reasoning.



- A. triangle
- B. quadrilateral
- C. pentagon
- D. square
- E. rhombus
- F. rectangle

2. Draw a quadrilateral that is not a rectangle, a rhombus, or a square.



Student Responses

1. B and E. It has 4 sides, which makes it a quadrilateral. All the sides have the same length,

which makes it a rhombus.

- Sample response: A drawing of a quadrilateral with no right angles and no sides having the same length.

----- Begin Lesson -----

Warm-up

🕒 10 min

Number Talk: Divide by 7

Standards Alignments

Addressing 3.OA.C.7

This Number Talk prompts students to rely on properties of operations and the relationship between multiplication and division to divide within 100. The reasoning here helps students develop fluency in division.

Instructional Routines

Number Talk

Student-facing Task Statement

Find the value of each expression mentally.

- $70 \div 7$
- $77 \div 7$
- $63 \div 7$
- $56 \div 7$

Student Responses

- 10: I know $7 \times 10 = 70$, so 70 divided by 7 is 10. I just know it.
- 11: Because $70 \div 7$ is 10, then it is just one more group of 7, so $77 \div 7$ is 11.

Launch

- Display one expression.
- “Give me a signal when you have an answer and can explain how you got it.”
- 1 minute: quiet think time

Activity

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

- 9: 63 is 7 less than 70, so it is 1 fewer group of 7, which is 9 groups.
- 8: It is 1 fewer group of 7 than the previous problem since $63 - 56 = 7$. I know that $8 \times 7 = 56$, so 56 divided by 7 is 8.

Synthesis

- “How did you use facts you know to find facts you didn’t know?” (I used $70 \div 7$ and thought about one more group to find $77 \div 7$. I used $70 \div 7$ and one less group to find $63 \div 7$.)

Activity 1

🕒 20 min

All the Ways

Standards Alignments

Addressing 3.G.A.1

The purpose of this activity is to deepen students’ understanding that a shape can belong to multiple categories because of its attributes. Students analyze shapes and determine all the ways that each one could be named. The names may refer to a broad category such as triangle or quadrilateral, or a narrower subcategory such as rhombus or rectangle. As they name the different categories students need to be precise both about the meaning of the categories and verifying the properties of the different shapes (MP6).

🌐 Access for English Learners

MLR8 Discussion Supports. Synthesis: For each observation that is shared, invite students to turn to a partner and restate what they heard using precise mathematical language.

Advances: Listening, Speaking

♿ Access for Students with Disabilities

Engagement: Provide Access by Recruiting Interest. Leverage choice around perceived challenge. Invite students to select at least 4 of the 6 problems.

Supports accessibility for: Organization, Attention, Social-Emotional Skills

Student-facing Task Statement

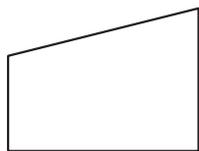
Select **all** the ways you could describe each shape. Be prepared to explain your reasoning.

1

2

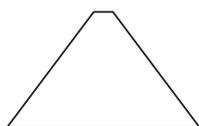
Launch

- Groups of 2
- “Look at the quadrilateral in the first problem. Work independently to circle all



- A. triangle
- B. quadrilateral
- C. square
- D. rhombus
- E. rectangle

3



- A. triangle
- B. quadrilateral
- C. pentagon
- D. rhombus
- E. rectangle
- F. square

5

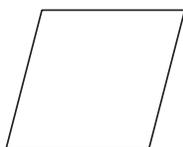


- A. hexagon
- B. quadrilateral
- C. triangle
- D. square
- E. rectangle
- F. rhombus



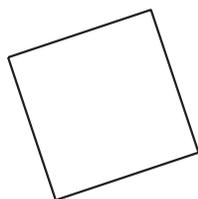
- A. triangle
- B. quadrilateral
- C. hexagon
- D. rhombus
- E. rectangle
- F. square

4



- A. triangle
- B. quadrilateral
- C. hexagon
- D. rhombus
- E. rectangle
- F. square

6



- A. hexagon
- B. quadrilateral
- C. triangle
- D. rhombus
- E. rectangle
- F. square

the names that you could use to describe the quadrilateral. Be prepared to share your reasoning."

- 1 minute: independent work time
- "Discuss your responses and reasoning with your partner."
- 2 minutes: partner discussion
- Share responses.

Activity

- "Complete the rest of the problems independently. Be prepared to explain your reasoning."
- 3–5 minutes: independent work time
- "Now, discuss your answers with your partner. Be sure to explain your reasoning for each way you described the shape. Also, be sure to ask your partner if you have any questions about their reasoning."
- 5–7 minutes: partner discussion
- Monitor for students who notice that some shapes can be described using multiple terms.

Synthesis

- Select 1–2 students to share the terms they selected for each of the last four quadrilaterals and their reasoning.
- Consider asking:
 - "Who can restate ____'s reasoning in a different way?"
 - "Does anyone want to add on to ____'s reasoning?"
 - "Do you agree or disagree? Why?"
- "The last shape can be described with 4 of the choices. How is it possible that it can be described in so many ways?" (It is a quadrilateral because it has 4 sides. It is a rhombus because it's a quadrilateral with 4

Student Responses

1. B
2. A
3. B
4. B and D
5. B and E
6. B, D, E, and F

sides that are the same length. It is a rectangle because it has 4 right angles and 2 pairs of sides that are the same length. It is a square because it has 4 sides that are the same length and 4 right angles. The last three are more specific descriptions of a quadrilateral.)

Advancing Student Thinking

If students use only one name for a shape that can be named in multiple ways, consider asking:

- “How did you describe the shape?”
- “Are there any other names that could be used to describe the shape?”

Activity 2

🕒 15 min

Draw One That’s Not . . .

Standards Alignments

Addressing 3.G.A.1

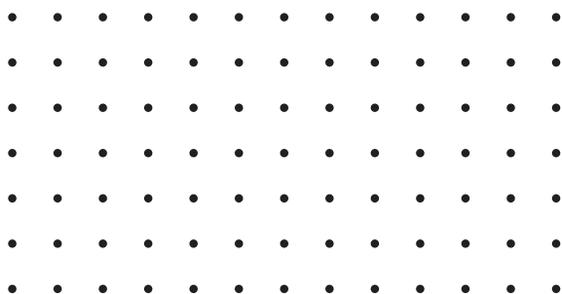
The purpose of this activity is for students to apply what they know about the defining attributes of rectangles, rhombuses, and squares to draw shapes that are not those quadrilaterals. They use geometric attributes to explain why their drawings meet the criteria.

Student-facing Task Statement

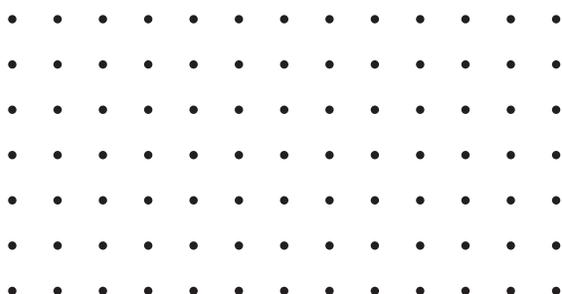
1. Draw a quadrilateral that isn’t a square.

Launch

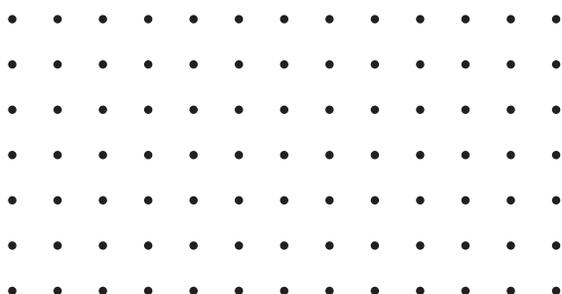
- Groups of 2
- “Take a minute and think about how you could draw a shape for each one of these descriptions.”



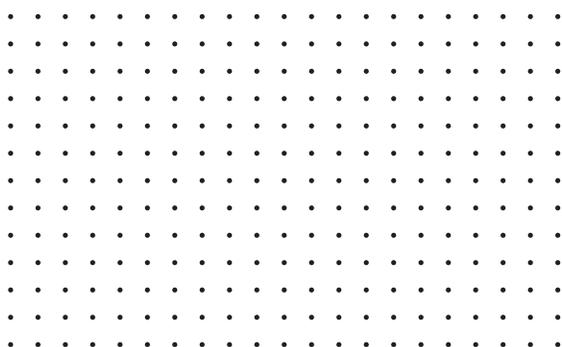
2. Draw a quadrilateral that isn't a rhombus.



3. Draw a quadrilateral that isn't a rectangle.



4. Draw as many quadrilaterals as you can that aren't rhombuses, rectangles, or squares.



Student Responses

Sample responses:

1.

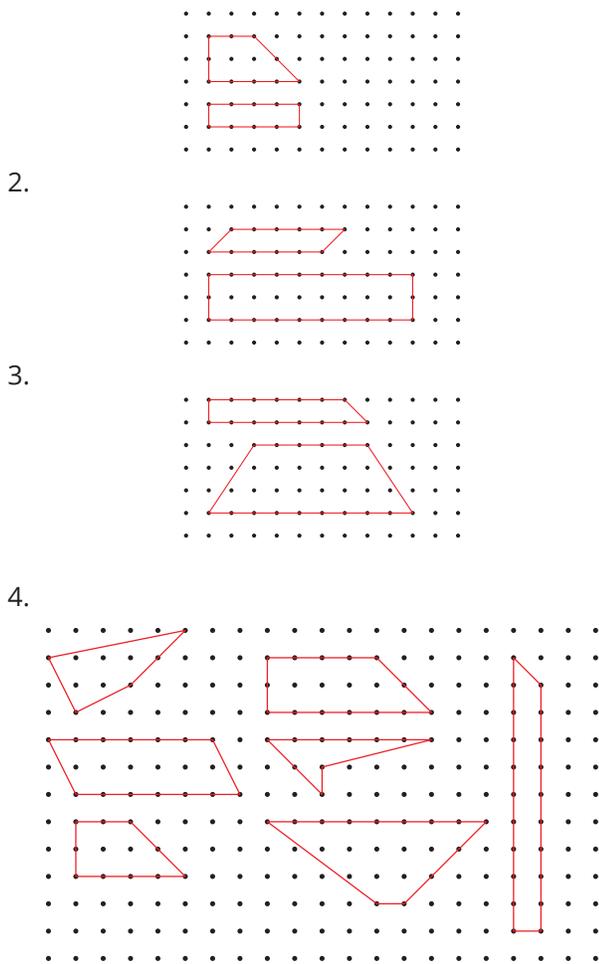
- 1 minute: quiet think time

Activity

- "Now, work with your partner to draw a shape for each statement. Be ready to explain how you know each shape matches the description given."
- 7-10 minutes: partner work time

Synthesis

- Select students to share their drawings and explanations for the first three problems.
- Highlight explanations that include the defining attributes of squares, rectangles, and rhombuses.
- Invite students to share as many different quadrilaterals as they can think of for the last problem. Display as many as possible.



Lesson Synthesis

🕒 10 min

“How has your thinking changed over the last few lessons about what a quadrilateral can look like?”
 (Before, when I thought of quadrilaterals, I thought of rectangles and squares, but now I know they can look so different. Some have right angles and some don’t. Some have sides with equal length and some don’t. They all look really different even though they have some things in common.)

Suggested Centers

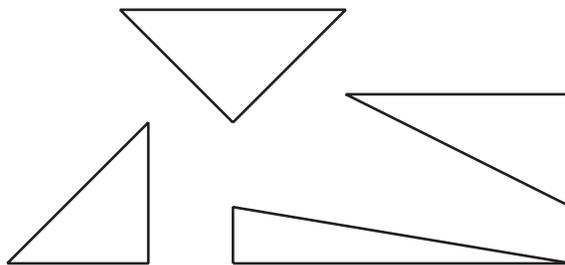
- Picture Books (K–5), Stage 3: Find Shapes (Addressing)
- Which One? (K–5), Stage 4: Grade 3 Shapes (Addressing)

Student Section Summary

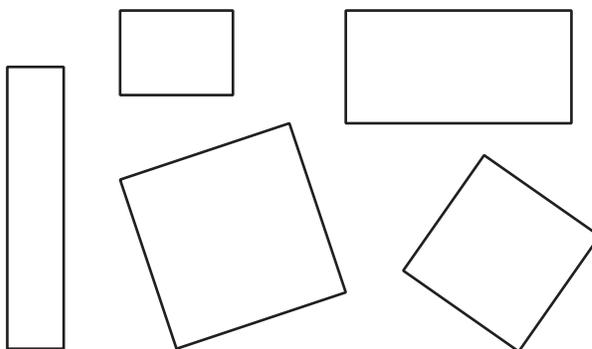
In this section, we learned to sort shapes based on attributes such as the number of sides, side lengths, and whether angles were right angles. We also sorted quadrilaterals and triangles into more specific groups.

We learned that a shape can be named based on its attributes. For example:

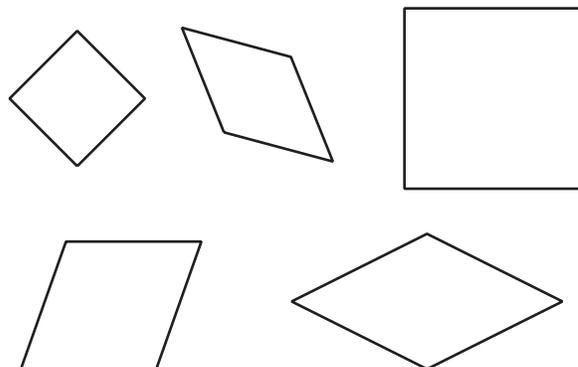
- If a triangle has a right angle, then it is a **right triangle**.



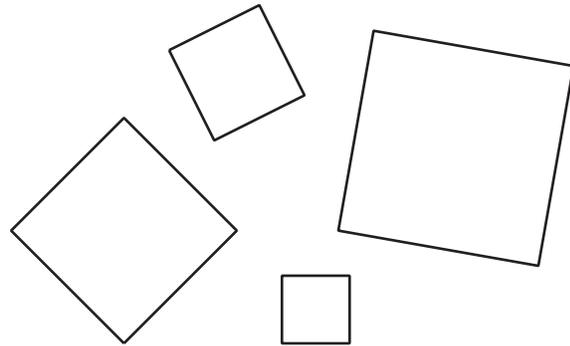
- If a quadrilateral has 2 pairs of sides that are the same length and 4 right angles, then it is a **rectangle**.



- If a quadrilateral has sides that are all the same length, then it is a **rhombus**.



- If a quadrilateral has sides that are all the same length and 4 right angles, then it is a **square**.



----- Complete Cool-Down -----

Response to Student Thinking

Students only identify the first shape as a quadrilateral or rhombus, but not both.

Next Day Support

- Before the warm-up, pass back the cool down and work in small groups to make corrections.

Section B: What is Perimeter?

Lesson 6: Distance Around Shapes

Standards Alignments

Addressing 3.MD.D, 3.MD.D.8

Building Towards 3.MD.D.8

Teacher-facing Learning Goals

- Describe perimeter as the length of the boundary of a flat shape.
- Find the perimeter of two-dimensional shapes.

Student-facing Learning Goals

- Let's find the distance around shapes.

Lesson Purpose

The purpose of this lesson is for students to understand perimeter and find the perimeter of shapes by counting to determine the side lengths.

In previous lessons, students reasoned about shapes and their attributes. In this lesson, students determine how many paper clips it takes to build a given shape to introduce **perimeter** as the boundary of a flat shape. Then, they find the distance around shapes with marked side lengths and consider different strategies for finding the total length of the sides. In the lesson synthesis, students have the opportunity to share familiar situations that could involve perimeter.

Access for:



Students with Disabilities

- Action and Expression (Activity 2)



English Learners

- MLR8 (Activity 2)

Instructional Routines

Notice and Wonder (Warm-up)

Materials to Gather

- Paper clips: Activity 1

Materials to Copy

- What Does It Take to Build the Shapes?

(groups of 4): Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	15 min
Activity 2	20 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

Reflect on how comfortable your students are asking questions of you and of each other. What can you do to encourage students to ask questions?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

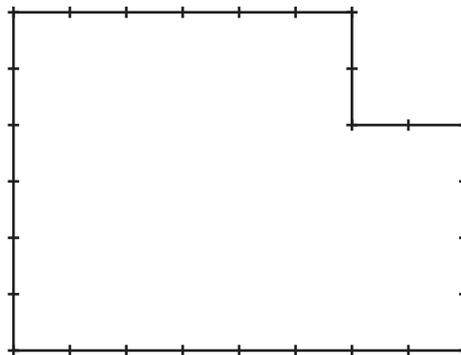
What is the Perimeter?

Standards Alignments

Addressing 3.MD.D.8

Student-facing Task Statement

Find the perimeter of this shape. Explain or show your reasoning.

**Student Responses**

28 units. Sample response: There are 2 sides that are 2 units each, and 2 sides that are 6 units each, so that's $(2 \times 2) + (2 \times 6)$ or $4 + 12$, which is 16. There are 2 other sides that are 8 units and 4 units, so that's 12 more. $16 + 12 = 28$

Begin Lesson

Warm-up

🕒 10 min

Notice and Wonder: Paper Clips & Shapes

Standards Alignments

Addressing	3.MD.D
Building Towards	3.MD.D.8

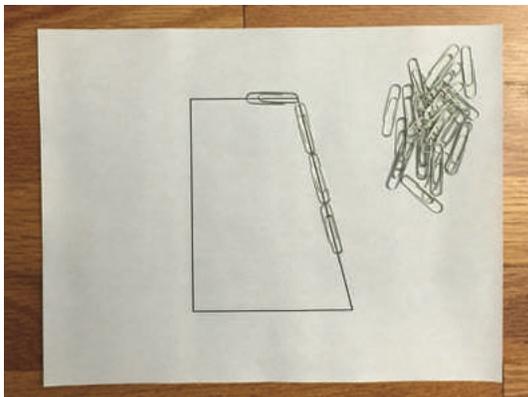
The purpose of this warm-up is for students to visualize the idea of perimeter and elicit observations about distances around a shape. It also familiarizes students with the context and materials they will be working with in the next activity, where they will use paper clips to form the boundary of shapes and compare or quantify their lengths.

Instructional Routines

Notice and Wonder

Student-facing Task Statement

What do you notice? What do you wonder?

**Student Responses**

Students may notice:

- There are some paper clips on two sides of a quadrilateral.
- The paper clips cover only parts of the two

Launch

- Groups of 2
- Display the image.
- “What do you notice? What do you wonder?”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Share and record responses.

Synthesis

- “Can you predict how many paper clips it might take to go around the whole shape?”
- Consider asking: “The paper clips in the picture are standard paper clips. If we use jumbo paper clips, which are larger, would we need more or fewer paper clips to build the shape?”

sides.

- There is a pile of paper clips on the paper.

Students may wonder:

- Are the paper clips to be used to build the shape?
- How many paper clips would it take to make the shape?
- Why are there only 4 clips on the sides of the shape?
- How many paper clips are in the pile?

Activity 1

🕒 15 min

What Does It Take to Build the Shapes?

Standards Alignments

Addressing 3.MD.D
Building Towards 3.MD.D.8

The purpose of this activity is to give students a concrete experience of building the boundary of shapes and quantifying that length of the boundary, allowing them to conceptualize perimeter as a measurable geometric attribute. Students use $1\frac{1}{4}$ -inch paper clips as the units for measuring the distances around four shapes. The reasoning here prepares them to reason about equal-size intervals that can be marked on the sides of a shape to measure its length (as students will see in the next activity).

Materials to Gather

Paper clips

Materials to Copy

What Does It Take to Build the Shapes?
(groups of 4)

Required Preparation

- Each group of 4 needs 25-50 paper clips that are $1\frac{1}{4}$ -inch long each.
- If using 1-inch paper clips, use 80% scale when making copies of the Instructional masters.

around a shape, like we did with paper clips, we are measuring its perimeter.”

- “To find the length of the perimeter of a shape, we can find the sum of its side lengths.”
- “We can say that the perimeter of shape A is 13 paper clips long.”
- “When we say ‘find the perimeter,’ we mean find the length of the perimeter.”

Activity 2

🕒 20 min

Distance Around

Standards Alignments

Addressing 3.MD.D.8

In this activity, students find the perimeter of shapes—first on dot paper, and then using the tick marks on the sides of the shapes. Students may need a reminder that when we measure length, we count the number of length-units, not the number of endpoints. While students may count the tick marks on all sides and add them, they may also observe that some side lengths are the same, especially on shapes A and B, and use this structure and multiplication by 2 to find the perimeter efficiently (MP8).

Access for English Learners

MLR8 Discussion Supports. Synthesis: To support the transfer of new vocabulary to long-term memory, invite students to chorally repeat these phrases in unison 1–2 times: perimeter and distance around a shape.

Advances: Speaking

Access for Students with Disabilities

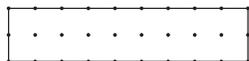
Action and Expression: Develop Expression and Communication. Synthesis: Identify connections between strategies that result in the same outcomes but use differing approaches.

Supports accessibility for: Visual-Spatial Processing

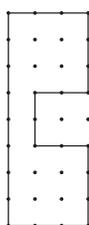
Student-facing Task Statement

Find the perimeter of each shape. Explain or show your reasoning.

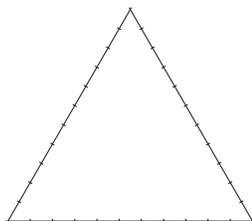
A



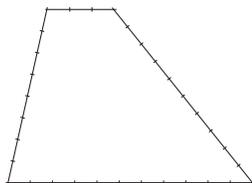
B



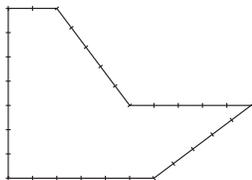
C



D



E



Student Responses

- A. 22 units. Sample response: I found $9 + 9 = 18$ for the long sides and $2 + 2 = 4$ for the short sides. $18 + 4 = 22$
- B. 26 units. Sample response: I put together the sides of the same length and did find $8 + (4 \times 3) + (3 \times 2)$, which is $8 + 12 + 6$ or 26.
- C. 33 units. Sample response: I counted around the shape 1, 2, 3, . . . 33.
- D. 32 units. Sample response: $11 + 8 + 3 + 10 = 32$
- E. 30 units. Sample response: I added the units in all the sides: $6 + 7 + 2 + 5 + 5 + 5 = 30$.

Launch

- Groups of 2
- “Earlier, we used paper clips to measure the distance around shapes. What are some other units we could use to measure distances or lengths?” (The side length of a square on grid paper, the distance between points on dot paper, centimeter, inch, foot)
- “Let’s find the length of the perimeter of some shapes on dot paper and some shapes whose side lengths are shown with tick marks.”

Activity

- “Work independently to find the perimeter of each shape. Afterwards, share your responses with your partner.”
- 5 minutes: independent work time
- 3–5 minutes: partner discussion
- Monitor for the different strategies students use to find the perimeter of each shape, such as counting one unit at a time, adding the number of length units of all sides, and using multiplication.

Synthesis

- Select students to share their responses and strategies. Start with those who counted individual units and move toward those who use operations.
- Record the strategies for all to see.
- “Which shape, C, D, or E, has the greatest perimeter?” (C. Its perimeter is 33 units. The other two are 30 and 32 units.)
- Consider asking: “Which shape has a greater perimeter: the rectangle in the first problem or the triangle?” (The triangle has 33 units while the rectangle has 22 units, but the units aren’t the same length, so we don’t know which perimeter is greater.)

Advancing Student Thinking

If students lose track of the side lengths they are counting, consider asking:

- “How are you finding the distance around the shape?”
- “How could you keep track of the side lengths as you work?”

Lesson Synthesis

🕒 10 min

“Today we learned what perimeter is. How would you describe perimeter to a friend?” (Perimeter is the distance around a shape or the length around a shape. It’s the length of all the sides added together.)

“How do you find the perimeter of a shape?” (We can count the number of units all the way around a shape or add up the number of units on each side.)

“One situation where we might find the perimeter of a shape is when putting a frame around a piece of artwork. The perimeter of the artwork can tell us how much framing material we need.”

“Can you think of other situations where it might be helpful to find the perimeter of a shape?” (Enclosing a yard with a fence. Decorating the edges of a piece of paper with ribbon.)

Suggested Centers

- Picture Books (K–5), Stage 3: Find Shapes (Addressing)
- Which One? (K–5), Stage 4: Grade 3 Shapes (Addressing)

Complete Cool-Down

Response to Student Thinking

Students do not find the perimeter of the shape.

Next Day Support

- During the launch of the next day's activity, have students discuss strategies they could use to find the perimeter of the shapes.

Lesson 7: Same Perimeter, Different Shapes

Standards Alignments

Addressing 3.MD.D.8, 3.NBT.A.2

Building Towards 3.MD.D.8

Teacher-facing Learning Goals

- Find the perimeter of two-dimensional shapes.
- Understand that many different shapes can have the same perimeter.

Student-facing Learning Goals

- Let's learn about shapes with the same perimeter.

Lesson Purpose

The purpose of this lesson is for students to practice finding the perimeter of shapes and to understand that many different shapes can have the same perimeter.

In previous lessons, students learned they can find the perimeter of a shape by adding the lengths of the sides. In this lesson, students match shapes with the same perimeter and draw different shapes that have the same perimeter.

Access for:

Students with Disabilities

- Action and Expression (Activity 1)

English Learners

- MLR7 (Activity 1)

Instructional Routines

True or False (Warm-up)

Lesson Timeline

Warm-up	10 min
Activity 1	15 min
Activity 2	20 min
Lesson Synthesis	10 min

Teacher Reflection Question

As students worked in their small groups today, whose ideas were heard, valued, and accepted? How can you adjust the group structure tomorrow to ensure that each student's ideas are a part of the collective learning?

Cool-down

5 min

Cool-down (to be completed at the end of the lesson)

🕒 5 min

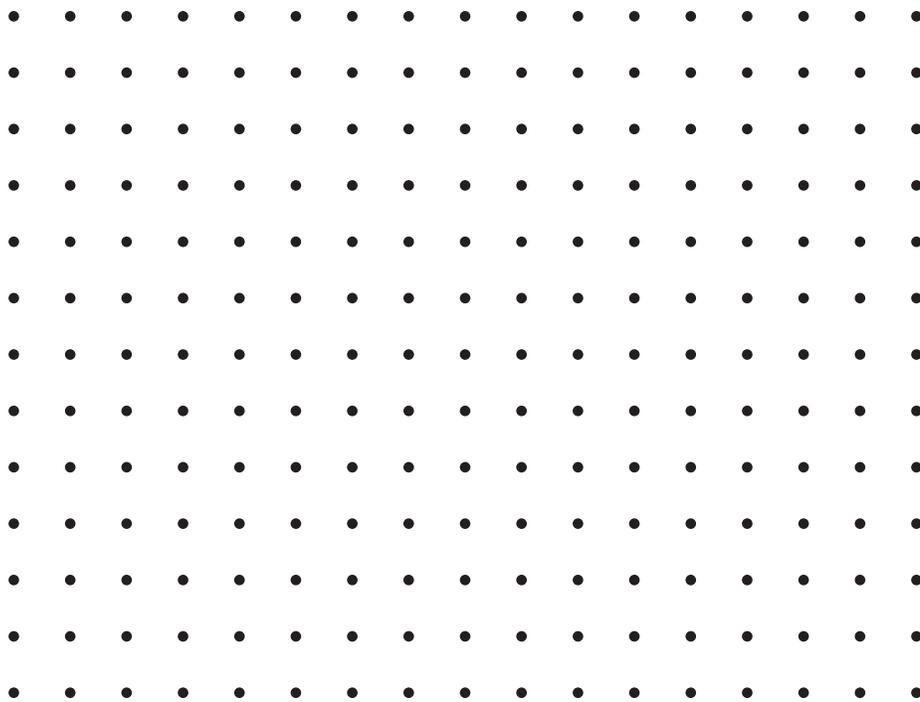
Create Your Own Shapes

Standards Alignments

Addressing 3.MD.D.8

Student-facing Task Statement

Draw 2 different shapes that have a perimeter of 32 units.

**Student Responses**

Answers vary.

----- Begin Lesson -----

Warm-up

 10 min

True or False: Sums of Four Numbers

Standards Alignments

Addressing 3.NBT.A.2

Building Towards 3.MD.D.8

The purpose of this True or False is to elicit strategies and understandings students have for adding multi-digit numbers. It prompts students to rely on their understanding of the properties of operations and place value. The strategies used here will be helpful as students find the perimeter of shapes with repeated side lengths later in the lesson.

Instructional Routines

True or False

Student-facing Task Statement

Decide whether each statement is true or false. Be prepared to explain your reasoning.

- $123 + 75 + 123 + 75 = 100 + 100 + 70 + 70 + 5 + 5 + 3 + 3$
- $123 + 75 + 123 + 75 = (2 \times 123) + (2 \times 75)$
- $123 + 75 + 123 + 75 = 208 + 208$
- $123 + 75 + 123 + 75 = 246 + 150$

Student Responses

- False: The expression on the right side is missing 2 twenties.
- True: On both sides there are 2 groups of 123 and 2 groups of 75.
- False: I know that $125 + 75 = 200$, so $123 + 75$ is less than 200.
- True: $75 + 75 = 150$ and $123 + 123 = 246$

Launch

- Display one equation.
- "Give me a signal when you know whether the equation is true and can explain how you know."
- 1 minute: quiet think time

Activity

- Share and record answers and strategy.
- Repeat with each equation.

Synthesis

- "How can you explain your answer without finding the value of both sides?"

Activity 1

🕒 15 min

All Kinds of Shapes

Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is for students to understand that many different shapes can have the same perimeter. Students start to focus more specifically on shapes with repeated side lengths, so they can leverage the efficient addition strategies elicited in the warm-up (MP7).

🌐 Access for English Learners

MLR7 Compare and Connect. Synthesis: After all strategies have been presented, lead a discussion comparing, contrasting, and connecting the different approaches for finding the perimeter of one of the shapes. Ask, “How did the same perimeter show up in each method?” and “Why did the different approaches lead to the same outcome?”

Advances: Representing, Conversing

♿ Access for Students with Disabilities

Action and Expression: Develop Expression and Communication. Synthesis: Identify connections between strategies that result in the same outcomes but use differing approaches.

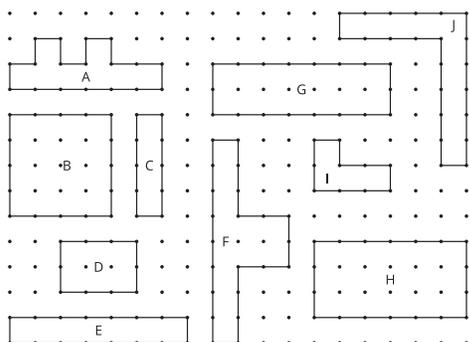
Supports accessibility for: Memory, Visual-Spatial Processing

Student-facing Task Statement

1. Choose any 3 shapes and find the perimeter of each shape. Explain or show your reasoning.
2. Find one shape that has the same perimeter as one of the shapes you chose earlier. Be prepared to explain your reasoning.

Launch

- Groups of 2
- Display the shapes.
- “Which shape do you think has the longest perimeter and which has the shortest?” (I think shape J has the longest—it looks like a really long shape. I think D has the shortest. It is small.)
- 1–2 minutes: partner discussion
- Share responses.



Student Responses

1. Sample responses:
 - Shape E: $7 + 7 = 14$ then $14 + 2 = 16$
 - Shape F: There are 2 sides that are 3 units, 2 sides that are 1 unit, 3 sides that are 2 units, and 1 side that is 8 units. $(2 \times 3) + (2 \times 1) + (3 \times 2) + 8$ is $6 + 2 + 6 + 8$, which is 22.
2. Shapes and their perimeter:
 - A, G, and H (18 units)
 - B and E (16 units)
 - C, D, and I (10 units)
 - F and J (22 units)

Activity

- “Work with your partner to find the perimeter of 3 shapes.”
- “Then, work independently to find at least one shape that has the same perimeter as a shape you chose.”
- 5 minutes: partner work time
- 2–3 minutes: independent work time
- Monitor for students who use sides of the same length or symmetry of the shape to find the perimeter in efficient ways.

Synthesis

- Invite students to share a variety of methods for finding the perimeter of the different shapes. Ask students who found the perimeter of shapes in efficient ways to share their reasoning.
- Consider asking: “Did anyone find the perimeter in a different way?”
- “Shapes A and G look very different but have the same length for their perimeter. How could that be?” (The shapes may look different but the distance around each is the same number of units. Different shapes can have the same perimeter.)

Advancing Student Thinking

If students count the individual units around each shape, consider asking:

- “How did you find the perimeter of this shape?”
- “What other strategies could you use so you wouldn’t have to count one unit at a time?”

Activity 2

Draw Your Own

🕒 20 min

Standards Alignments

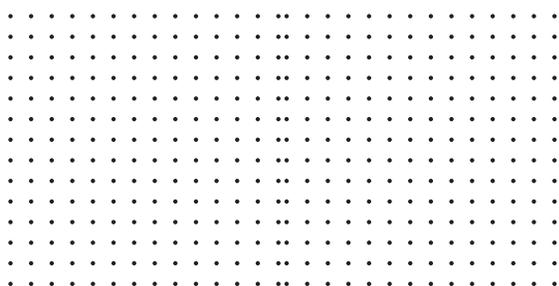
Addressing 3.MD.D.8

The purpose of this activity is for students to draw shapes with specific perimeters. Students may create any shape that uses horizontal and vertical lines. Since diagonal lines that connect the dots are not one length unit, students cannot find the perimeter of shapes that include diagonal sides. Encourage students to be creative in drawing their shapes to reinforce the idea that different shapes can have the same perimeter.

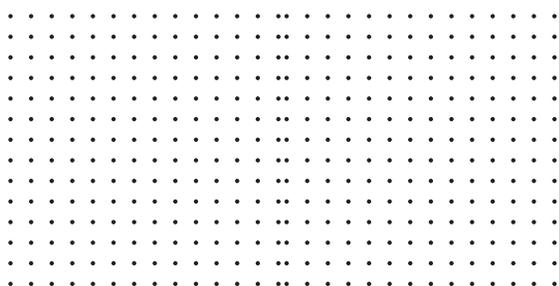
Student-facing Task Statement

1. Draw 2 shapes with each perimeter.

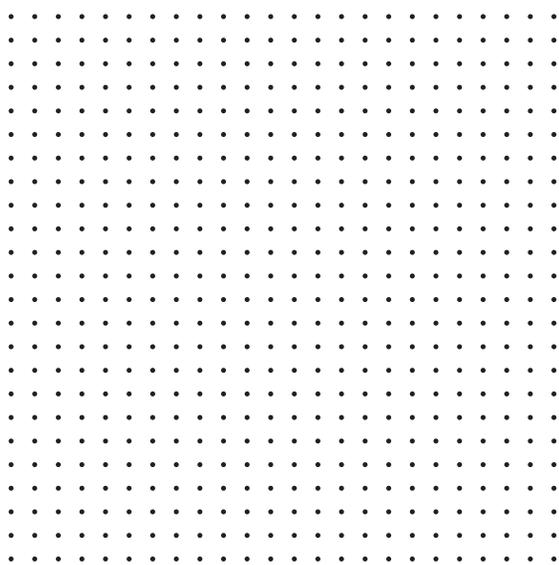
12 units



26 units



48 units



Launch

- Groups of 2

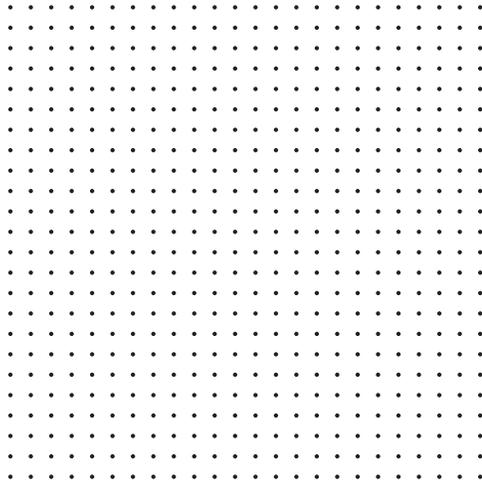
Activity

- “Work independently to draw two shapes that have each perimeter. Be prepared to explain how you drew your shapes.”
- 8–10 minutes: independent work time
- Monitor for students who:
 - draw shapes other than rectangles or squares
 - can explain their method for drawing shapes with a specific perimeter, such as drawing sides of the same length first or drawing sides one at a time around the shape
- “Share the shapes you drew with your partner. Think about how your shapes are alike and how they are different. Afterwards, work on the last problem together.”
- 5 minutes: partner work time

Synthesis

- Select previously identified students to share their strategies for drawing shapes

2. a. With your partner, choose a length. Then, draw your own shape with that perimeter.



- b. Share the shapes you drew and discuss how they are alike and how they are different.

for one of the perimeters in the first problem.

- “What perimeter did you and your partner choose to draw a shape for? Why did you pick that number?”

Student Responses

1. Answers vary.
2. Answers vary.

Lesson Synthesis

🕒 10 min

“Today we learned that different shapes can have the same perimeter.”

“How would you explain to someone how this is possible?” (The perimeter is the total length of all the sides of a shape, and there are different ways to add numbers to get the same sum.)

Consider using a string of interconnected paper clips to form different shapes. The shapes would have the same perimeter because the length of the string (or the number of paper clips) hasn’t changed.

Suggested Centers

- Can You Draw It? (1–5), Stage 3: Grade 3 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 3: Grade 3 Shapes (Addressing)

----- **Complete Cool-Down** -----

Response to Student Thinking

Students do not draw shapes with perimeters of 32 units.

Next Day Support

- Before the warm-up, pass back the cool down and work in small groups to make corrections.

Lesson 8: Find the Perimeter

Standards Alignments

Addressing 3.MD.D.8, 3.OA.C.7

Teacher-facing Learning Goals

- Find the perimeter of two-dimensional shapes given all or some of the side lengths.

Student-facing Learning Goals

- Let's find the perimeter of more shapes.

Lesson Purpose

The purpose of this lesson is for students to find perimeters of shapes given all or some of the side lengths.

In previous lessons, students learned about attributes of two-dimensional shapes. They also learned about perimeter and drew shapes with specific perimeters. In this lesson, students find perimeters of shapes given side lengths and use the attributes of shapes to find the perimeter given only some of the side lengths.

Access for:

Students with Disabilities

- Representation (Activity 2)

English Learners

- MLR8 (Activity 1)

Instructional Routines

5 Practices (Activity 1), MLR7 Compare and Connect (Activity 2), Number Talk (Warm-up)

Materials to Gather

- Tools for creating a visual display: Activity 2

Lesson Timeline

Warm-up	10 min
Activity 1	20 min
Activity 2	15 min

Teacher Reflection Question

How did students leverage their geometry knowledge about attributes of shapes to reason about perimeter in today's lesson?

Lesson Synthesis 10 min

Cool-down 5 min

Cool-down (to be completed at the end of the lesson)

🕒 5 min

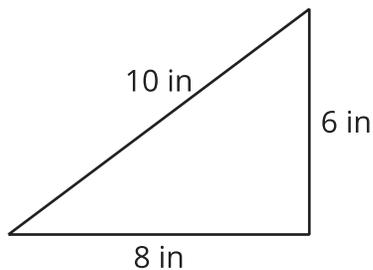
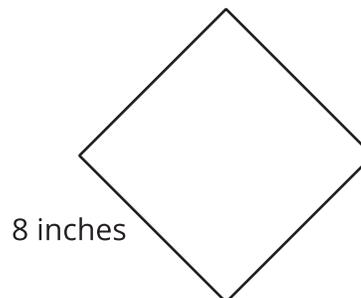
A Triangle and a Square

Standards Alignments

Addressing 3.MD.D.8

Student-facing Task Statement

Find the perimeter of each shape. Explain or show your reasoning.

A**B****Student Responses**A: 24 in. Sample response: $6 + 8 + 10 = 24$ B: 32 in. Sample response: I multiplied 4×8 since there are 4 sides that are the same length.----- **Begin Lesson** -----**Warm-up**

🕒 10 min

Number Talk: Decreasing Dividend

Standards Alignments

Addressing 3.OA.C.7

The purpose of this Number Talk is to elicit strategies and understandings students have for dividing within 100. These understandings help students develop fluency and are helpful as students use division to solve problems involving perimeter.

Instructional Routines

Number Talk

Student-facing Task Statement

Find the value of each expression mentally.

- $90 \div 9$
- $81 \div 9$
- $45 \div 9$
- $54 \div 9$

Student Responses

- 10: I just know it.
- 9: 81 is 9 less than 90, so it is 1 fewer group of 9.
- 5: It is half of $90 \div 9$ since 45 is half of 90.
- 6: 54 is 9 more than 45, so it's 1 more group of 9 than the previous expression.

Launch

- Display one expression.
- "Give me a signal when you have an answer and can explain how you got it."
- 1 minute: quiet think time

Activity

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

Synthesis

- "How could knowing $90 \div 9$ help you find the value of the other expressions?" (Once I knew $90 \div 9$ I was able to take away a group of 9 to find $81 \div 9$. I was able to find $45 \div 9$ by splitting the value of $90 \div 9$ because 45 is half of 90.)

Activity 1

Ways to Find Perimeter

 20 min

 PLC Activity

Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is for students to practice finding the perimeter of shapes that have labeled side lengths. The synthesis focuses on methods students have for efficiently finding the perimeter of shapes with some or all side lengths having equal length. As students discuss and justify their decisions, they share a mathematical claim and the thinking behind it (MP3).

Monitor and select students who find the perimeter of the hexagon by:

- adding the individual side lengths around the shape
- adding the two 8-inch side lengths together and the four 4-inch side lengths together and then adding those sums together
- multiplying like side lengths, then adding, such as 2×8 for the long sides and 4×4 for the short sides and then adding those products together
- using symmetry to split the shape in half horizontally and adding $4 + 8 + 4 = 16$ for the top half of the shape and then doubling that for the sides on the bottom half of the shape

Access for English Learners

MLR8 Discussion Supports. Synthesis: Provide students with the opportunity to rehearse what they will say with a partner before they share with the whole class.

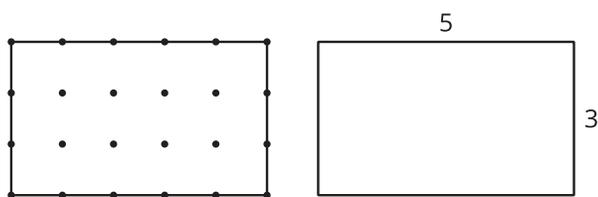
Advances: Speaking

Instructional Routines

5 Practices

Student-facing Task Statement

What do you notice? What you wonder?

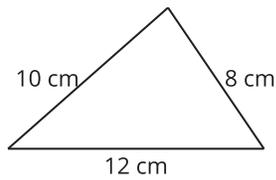


Find the perimeter of each shape. Explain or show your reasoning.

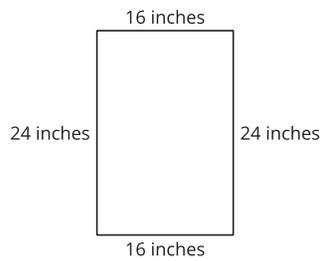
Launch

- Groups of 2
- Display the image.
- “What do you notice? What do you wonder?” (Students may notice: One rectangle has numbers on the sides. One rectangle has tick marks on the sides. The rectangles are the same size. Students may wonder: Why are the sides of the rectangles marked differently? Could we find the distance around the rectangle with

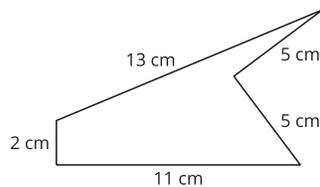
1.



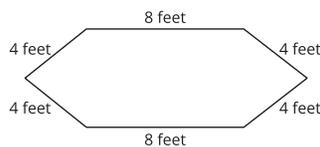
2.



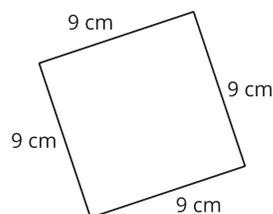
3.



4.



5.



Student Responses

- 30 cm. Sample response: $12 + 8 = 20$ and then 10 more is 30.
- 80 inches. Sample response: $24 + 16 = 40$ for one short side and one long side, then

the numbers on the sides?)

- 1 minute: quiet think time
- 1 minute: partner discussion
- Share and record responses.

Activity

- "Work with your partner to find the perimeter of each shape."
- 5–7 minutes: partner work time
- As students work, consider asking:
 - "How does having sides of the same length help us find the perimeter?"
 - "Can you multiply to find the perimeter?"

Synthesis

- Ask previously identified students to share their strategies for finding the perimeter of the hexagon. Arrange the presentations in the order listed in the activity narrative.
- Give students a chance to ask questions about each strategy as it is shared.
- "How does having sides of the same length help us find the perimeter?"
- Consider asking:
 - "Why does this strategy work with this shape?"
 - "Did anyone else find the perimeter of this shape in a different way?"
- "Was it easier to find the perimeter of some shapes in this activity than others? Why?" (Yes, some of the shapes had several sides that are the same length, so we could multiply. In a rectangle, we can add two sides and then double the result to find the whole perimeter.)

$40 + 40 = 80$ because the other two sides are the same length as the ones I just added.

3. 36 cm. Sample response:
 $2 + 13 + 5 + 5 + 11 = 36$
4. 32 feet. Sample response: I multiplied 2×8 for the long sides. This gave me 16. Then I multiplied 4×4 for the short sides and this gave me 16. Then, I added the short sides and the long sides to get 32.
5. 36 cm. Sample response: There were 4 sides that were 9 cm, so I multiplied 4×9 to get 36.

Activity 2

🕒 15 min

Something is Missing

Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is for students to find the perimeter of shapes when some of the side lengths are not given. Students use their knowledge of shapes to reason about the length of the missing sides before they find the perimeter of the shape (MP7).

This activity uses *MLR7 Compare and Connect*. Advances: representing, conversing

♿ Access for Students with Disabilities

Representation: Internalize Comprehension. Synthesis: Invite students to identify which details were most useful to solve the problem. Display the sentence frame: "The next time I find the perimeter of a shape where some side lengths are not given, I will pay attention to . . ."

Supports accessibility for: Memory, Visual-Spatial Processing

Instructional Routines

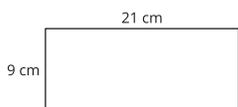
MLR7 Compare and Connect

Materials to Gather

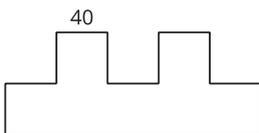
Tools for creating a visual display

Student-facing Task Statement

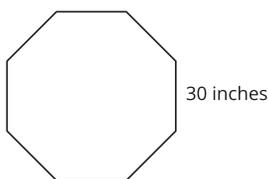
1. Find the perimeter of this rectangle. Explain or show your reasoning.



2. All the short sides of this figure are the same length, and all the angles are right angles. Find the perimeter. Explain or show your reasoning.



3. All the sides of the octagon are the same length. Find the perimeter. Explain or show your reasoning.



Student Responses

1. 60 cm. Sample response: The two labeled sides add up to 30. The two unlabeled sides are also 21 and 9, which is another 30.
2. 640 units. Sample response: There are 11 short side lengths, so that's 10×40 plus 1×40 , which is 440. The longer side is the same length as 5 of the shorter sides, so it's

Launch

- Groups of 2
- Display the rectangle from the first problem.
- "Find the perimeter of this rectangle."
- 1–2 minutes: independent work time
- "Discuss with your partner how you found the perimeter of this rectangle even though some of the side lengths were not labeled." (Since the shape is a rectangle, we know opposite sides of a rectangle are the same length.)
- 1 minute: partner discussion
- Share and record responses.
- Give each group tools for creating a visual display.

Activity

- "Work with your partner to find the perimeter of the other two shapes. Be sure to record your reasoning to share with the class."
- 6–8 minutes: partner work time
- Consider asking: "How did you know the length of that side?"

MLR7 Compare and Connect

- "Create a visual display that shows your thinking about the second problem. You may want to include details such as notes, diagrams, drawings, and so on, to help others understand your thinking."
- 3–5 minutes: partner work time
- 5 minutes: gallery walk

5×40 or 200. Adding 440 and 200 gives 640.

3. 240 in. Sample response: There are 8 sides, so it's 8 thirties or $8 \times 3 \times 10$, which is 240.

Synthesis

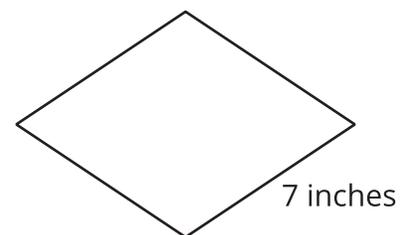
- “We had to find a lot of missing side lengths in this shape before we could find the perimeter.”
- “As you visited the displays, what did you notice about how others found the missing side lengths?” (I noticed some groups counted the number of short sides and multiplied by 40. I noticed some put the short side lengths into smaller groups before finding their combined lengths.)
- Consider asking:
 - “Did anyone find the missing side lengths in a different way than you and your partner?”
 - “Did anyone find the perimeter in a different way than you and your partner?”

Lesson Synthesis

🕒 10 min

“When you are finding the perimeter of a shape, you can always add the lengths of the sides one at a time. What other methods do you have for finding the perimeter of shapes?” (We can look for side lengths that are the same and group them together. In a square, we can multiply one side length by 4 since they are all the same length. In a rectangle, we can add a long side to a short side and then double that for the whole perimeter.)

Display a rhombus with side lengths that are the same length, but only one side labeled 7 in, such as:



“How can we find the perimeter of this rhombus if only one side is labeled?” (We know that a rhombus has four equal sides, so we can find 4×7 , which is 28.)

Suggested Centers

- Can You Draw It? (1–5), Stage 3: Grade 3 Shapes (Addressing)
- Which One? (K–5), Stage 4: Grade 3 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 3: Grade 3 Shapes (Addressing)

Complete Cool-Down

Response to Student Thinking

Students find the perimeter of the second shape, but they add each side length individually to find the sum.

Next Day Support

- Before the next day's warm-up, pass back the cool-down and have students brainstorm strategies they could use to find the perimeter of the second shape.

Lesson 9: Perimeter Problems

Standards Alignments

Addressing 3.MD.D.8

Teacher-facing Learning Goals

- Find unknown side lengths given the perimeter of a shape.
- Solve problems that involve perimeters of shapes.

Student-facing Learning Goals

- Let's solve problems about perimeter.

Lesson Purpose

The purpose of this lesson is for students to find unknown side lengths given the perimeter of a shape and solve problems involving perimeter.

In previous lessons, students learned how to find the perimeter of shapes given all sides lengths or some side lengths. In this lesson, students use their understanding of perimeter to find missing side lengths when given the perimeter. Then, students solve problems in situations that involve perimeter. This lesson prepares students to think carefully about the difference between perimeter and area, which will be addressed in subsequent lessons.

This lesson has a Student Section Summary.

Access for:

Students with Disabilities

- Engagement (Activity 2)

English Learners

- MLR8 (Activity 2)

Instructional Routines

Estimation Exploration (Warm-up)

Lesson Timeline

Warm-up	10 min
Activity 1	15 min

Teacher Reflection Question

How are students working toward multiplication and division fluency while solving perimeter problems?

Activity 2	20 min
Lesson Synthesis	10 min
Cool-down	5 min

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Sides of a Pool

Standards Alignments

Addressing 3.MD.D.8

Student-facing Task Statement

A rectangular swimming pool has a perimeter of 94 feet. If it is 32 feet on one side, what are the lengths of the other three sides? Explain or show your reasoning.

Student Responses

15 feet, 32 feet, and 15 feet. Sample response: I know that one of the other sides is the same length as 32 feet, so that's $32 + 32 = 64$ for two sides. $94 - 64 = 30$, so the other two sides are 30 feet together. I can divide 30 by 2 to get 15.

Begin Lesson

Warm-up

🕒 10 min

Estimation Exploration: Statue of Liberty

Standards Alignments

Addressing 3.MD.D.8

The purpose of an Estimation Exploration is to practice the skill of estimating a reasonable answer based on experience and known information.

Instructional Routines

Estimation Exploration

Student-facing Task Statement

The Statue of Liberty has two square bases—one larger than the other. The larger base has side lengths of 132 feet each.

Estimate the perimeter of the smaller square base.



Record an estimate that is:

too low	about right	too high

Student Responses

Sample responses:

- Too low: 200–280 feet
- About right: 280–400 feet
- Too high: greater than 400 feet

Launch

- Groups of 2
- Display the image.
- “What is an estimate that’s too high?” “Too low?” “About right?”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Record responses.

Synthesis

- “If you wanted to know the perimeter of the star-shaped base, how would you find it?” (We’d need to know the length of each side and add the lengths together. If the lengths were the same we could count them and multiply the length by number of sides.)
- Consider asking:
 - “Based on this discussion does anyone want to revise their estimate?”

Activity 1

🕒 15 min

Missing Measurements

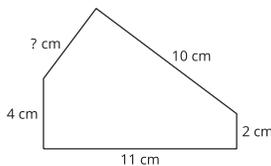
Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is for students to find the length of a missing side of a shape when the perimeter is given, using any strategy that makes sense to them. The synthesis highlights the variety of methods students used to solve the problem.

Student-facing Task Statement

- This pentagon has a perimeter of 32 cm. What is the length of the missing side? Explain or show your work.



- This rectangle has a perimeter of 56 feet. What are the lengths of the unlabeled sides? Explain or show your work.



- This pentagon has a perimeter of 65 inches. All the sides are the same length. What is the length of each side? Explain or show your work.

Launch

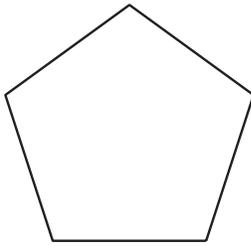
- Groups of 2
- "In an earlier lesson, we found the perimeter of shapes when not all the side lengths were labeled. Now, let's find some missing side lengths when we know the perimeter."

Activity

- 5–7 minutes: partner work time
- Monitor for students who:
 - subtract each side length from the perimeter
 - double a given side length, subtract the result from the perimeter, and divide to find the other two sides
 - divide the perimeter when the side lengths are all equal

Synthesis

- Select previously identified students to share their strategies. Be sure to share at least one method (more if possible) for each problem.



Student Responses

1. 5 cm. Sample response: I subtracted all the given side lengths from 32.
2. 8 feet and 20 feet. Sample response: I doubled 8 since the opposite side has to be the same length, and then subtracted 16 from 56 to get 40. Then I divided 40 by 2 to get 20 for the other side lengths.
3. 13 inches. Sample response: I divided 65 by 5. I know that $5 \times 10 = 50$ and $5 \times 3 = 15$, so each side is $10 + 3$ or 13 inches.

- Consider asking:
 - “When would this strategy be most useful?”
 - “Did anyone think about it in a different way?”

Activity 2

🕒 20 min

Can I Use Perimeter?

Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is for students to solve problems in situations that involve perimeter (MP2). Students may draw diagrams with length labels or simply reason arithmetically. They also explain how each problem does or does not involve perimeter. The activity synthesis provides an opportunity to begin discussing the difference between area and perimeter, which will be fully explored in upcoming lessons.

Access for English Learners

MLR8 Discussion Supports. Prior to solving the problems, invite students to make sense of the situations and take turns sharing their understanding with their partner. Listen for and clarify any questions about the context.

Advances: Reading, Representing

Access for Students with Disabilities

Engagement: Provide Access by Recruiting Interest. Synthesis: Invite students to generate a list of additional examples of needing to know the perimeter of an object or space that connect to their personal backgrounds and interests.

Supports accessibility for: Language, Visual-Spatial Processing

Student-facing Task Statement

Solve each problem. Explain or show your reasoning.

1. A rectangular park is 70 feet on the shorter side and 120 feet on the longer side. How many feet of fencing is needed to enclose the boundary of the park?
2. Priya drew a picture and is framing it with a ribbon. Her picture is square and one side is 9 inches long. How many inches of ribbon will she need?
3. A rectangular flower bed has a fence that measures 32 feet around. One side of the flower bed measures 12 feet. What are the lengths of the other sides?
4. Kiran took his dog for a walk. Their route is shown. How many blocks did they walk?

Launch

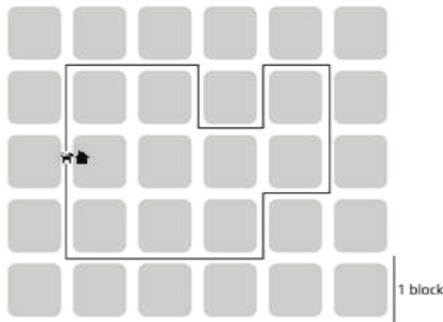
- Groups of 2

Activity

- "Take some time to solve these problems on your own."
- 5 minutes: independent work time
- "Share with your partner your reasoning on your favorite problem."
- 2 minutes: partner discussion
- Monitor for a variety of ways students solve these problems, such as by drawing a diagram or writing expressions or equations. Identify one student to share for each problem, with a variety of ways shown across the problems.

Synthesis

- Select previously identified students to share their reasoning for each problem. After each problem, consider asking: "Did anyone solve this problem in a different way?"
- If possible, keep the student work



5. A room is 10 feet by 8 feet. How many tiles will be needed to cover the floor if each tile is 1 square foot?

Student Responses

- 380 feet. Sample response: $70 + 70 = 140$, $120 + 120 = 240$, $140 + 240 = 380$.
- 36 inches. Sample response: There are 4 sides and they are all 9 inches so I multiplied 4×9 to get 36.
- 12 feet, 4 feet, and 4 feet. Sample response: $12 + 12 = 24$, $32 - 24 = 8$, $8 \div 2 = 4$.
- 16 blocks. Sample response: I added $3 + 3 + 2 + 1 + 1 + 1 + 1 + 2 + 1 + 1$ and got 16.
- 80 tiles. Sample response: I multiplied 10×8 to get 80.

displayed for the lesson synthesis.

Advancing Student Thinking

If students say they aren't sure how to get started on a problem, consider asking:

- "What is the problem about?"
- "How could you represent the problem?"

Lesson Synthesis

🕒 10 min

“Look back through the problems you solved in the last activity. Discuss with your partner whether each problem involves perimeter.”

“How do you know if a situation involves perimeter?” (If it’s about finding the distance around something. If answering the question means adding up all the side lengths of a shape.)

“Why was perimeter not useful in the last problem about tiling a floor?” (The perimeter would give the length around the outside of the room, not how many tiles covered the whole room. To know how many tiles cover the whole room is to find the area of the room.)

“What is the difference between perimeter and area?” (Perimeter is the distance around the outside of a shape. Area is the amount of space a shape covers.)

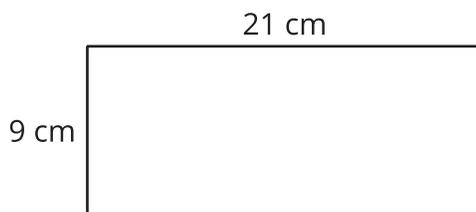
Suggested Centers

- Can You Draw It? (1–5), Stage 3: Grade 3 Shapes (Addressing)
- Which One? (K–5), Stage 4: Grade 3 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 3: Grade 3 Shapes (Addressing)

Student Section Summary

In this section, we learned that **perimeter** is the boundary of a flat shape.

We can find the length of a perimeter by adding the lengths of all the sides, or by using multiplication when there are sides with the same length.



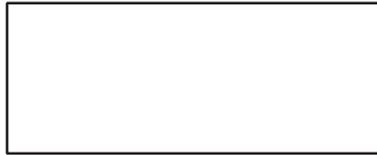
$$9 + 9 + 21 + 21$$

$$(2 \times 9) + (2 \times 21)$$

We used our knowledge of shapes to find the perimeter even when some side lengths were missing, and to use the perimeter to find missing side lengths.

For example, if we know the perimeter of this rectangle is 32 feet, we can find the lengths of the three unlabeled sides.

12 feet



----- Complete Cool-Down -----

Response to Student Thinking

Students identify the side that is 32 feet long (opposite of the given side) but not the other two sides of the swimming pool.

Next Day Support

- Before the warm-up, select a student's cool-down from the previous lesson (name anonymous). Ask students to identify what the student did well and what the student needs to do to improve the cool-down.

Section C: Expanding on Perimeter

Lesson 10: Problem Solving With Perimeter and Area

Standards Alignments

Addressing 3.MD.D.8, 3.OA.C.7, 3.OA.D.8

Teacher-facing Learning Goals

- Solve problems that involve perimeter and area of rectangles.

Student-facing Learning Goals

- Let's solve problems involving perimeter and area.

Lesson Purpose

The purpose of this lesson is for students to solve problems that involve both perimeter and area of rectangles in order to reinforce the difference between perimeter and area.

In previous lessons, students learned what area is and how to find the area of rectangles and figures made up of rectangles. They also learned how to measure the perimeter of other shapes, solve problems that involved perimeter, and recognize situations in which perimeter is and is not relevant. By the end of this lesson, students confirm that while perimeter and area are both measurements that can appear together in problems, perimeter is a linear measurement while area is two-dimensional.

Access for:

Students with Disabilities

- Representation (Activity 2)

English Learners

- MLR1 (Activity 1)

Instructional Routines

MLR4 Information Gap (Activity 2), True or False (Warm-up)

Materials to Copy

- Info Gap: A Garden and a Playground (groups of 2): Activity 2

Lesson Timeline

Warm-up	10 min
Activity 1	15 min
Activity 2	20 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

What was the best question you asked students today? Why would you consider it the best one based on what students said or did?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

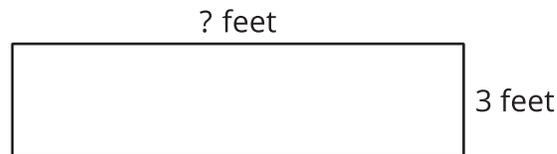
Lin's Garden Fence

Standards Alignments

Addressing 3.MD.D.8

Student-facing Task Statement

Lin is building a fence around her rectangular garden. A diagram is shown. The area of the garden is 36 square feet. How many feet of fencing material will she need to enclose the whole garden?

**Student Responses**

30 feet. Sample response: If the area is 36 square feet and one side is 3, I can divide 36 by 3 to find the missing side. Since $3 \times 12 = 36$, the missing side is 12 feet long. The perimeter can be found by adding 2×12 and 2×3 , which is 24 and 6. $24 + 6 = 30$.

----- **Begin Lesson** -----**Warm-up**

🕒 10 min

True or False: Divide in Parts

Standards Alignments

Addressing 3.OA.C.7

The purpose of this True or False is to elicit strategies and understandings students have for dividing within 100. It also prompts them to rely on properties of operations and familiar division facts to facilitate division.

When students think about how to decompose larger dividends using facts about 10 to make the division easier, they look for and make use of structure (MP7).

Instructional Routines

True or False

Student-facing Task Statement

Decide if each statement is true or false. Be prepared to explain your reasoning.

- $60 \div 6 = 10$
- $72 \div 6 = (60 \div 6) + (12 \div 6)$
- $78 \div 6 = (60 \div 10) + (18 \div 6)$
- $96 \div 8 = (80 \div 8) - (16 \div 8)$

Student Responses

- True: I just know it.
- True: 72 is $60 + 12$, so I can divide in parts and add the quotients.
- False: 78 is $60 + 18$, but we need to divide each part of the dividend by 6, not by 10.
- False: 96 is $80 + 16$ and we can divide each part by 8, but then we need to add the parts together, not subtract.

Launch

- Display one statement.
- “Give me a signal when you know whether the statement is true and can explain how you know.”
- 1 minute: quiet think time

Activity

- Share and record answers and strategy.
- Repeat with each statement.

Synthesis

- “How can you explain your answer without finding the value of both sides?”

Activity 1

 15 min

Rope Off the Garden

Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is for students to differentiate methods for finding perimeter from those for finding area. While addition and multiplication are both involved in various ways, students need to understand the problem situation and think about whether the operations performed will provide the desired information. As in earlier problems, students can find perimeter in various ways. The emphasis should be on how understanding the problem situation and the information given should inform the solution method.

When students analyze claims about how to use addition and multiplication to find the perimeter of a rectangle they construct viable arguments (MP3).

Access for English Learners

MLR1 Stronger and Clearer Each Time. Synthesis: Before the whole-class discussion, give students time to meet with 2–3 partners to share and get feedback on their response to “Who do you agree with? Explain or show your reasoning.” Invite listeners to ask questions, to press for details and to suggest mathematical language. Give students 2–3 minutes to revise their written explanation based on the feedback they receive.

Advances: Writing, Speaking, Listening

Student-facing Task Statement

Andre wants to know how much rope is needed to enclose the new rectangular school garden. The length of the garden is 30 feet. The width of the garden is 8 feet.

- Clare says she can use multiplication to find the length of rope Andre needs.
- Diego says he can use addition to find the length of rope Andre needs.

Who do you agree with? Explain or show your reasoning.

Student Responses

Sample responses:

- I agree with Diego because to find the

Launch

- Groups of 2 and 4
- Display the situation: “Andre wants to know how much rope is needed to rope off the new rectangular school garden. The length of the garden is 30 feet. The width of the garden is 8 feet.”
- “Take a minute to read this situation about Andre and the school garden. How would you figure out how many feet of rope is needed?”
- 1 minute: quiet think time

Activity

- “With your partner, look at Clare and Diego’s thinking and answer the questions.”

length of rope is to find the perimeter by adding up the side lengths of the garden. Multiplying 8×30 would give the area.

- I agree with Clare because if we add the side lengths, $30 + 8 = 38$, and then find 38×2 , we will get the perimeter of the garden.

- 3–5 minutes: partner work time

Synthesis

- Invite students to share who they agreed with and why. Record their reasoning for all to see.
- “How did you know that multiplying 8×30 would not give you the total amount of rope needed?” (Multiplying 8×30 would give us the area of the rectangle, not the distance around the rectangle.)
- “How did you know that Diego’s strategy would work?” (Diego is finding the perimeter by adding the side lengths of the garden.)
- “When might it be appropriate to use multiplication to find perimeter?” (When there are two or more sides that are the same length. When we know half of the perimeter, we can double that number to find the whole perimeter.)

Activity 2

🕒 20 min

Info Gap: A Garden and a Playground

Standards Alignments

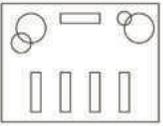
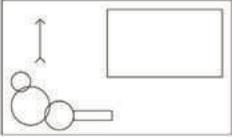
Addressing 3.MD.D.8, 3.OA.D.8

This info gap activity gives students a chance to understand that given the area and one side length of a rectangle, the perimeter can be found, and that given the perimeter and one side length of a rectangle, the area can be found. In both cases, students need to find the missing side length to solve the problem. There are several ways students might find the missing side length and then the perimeter or area once the missing side length is known.

This activity uses MLR4 Information Gap.

The info gap structure requires students to make sense of problems by determining what information is necessary, and then to ask for information they need to solve it. This may take several rounds of discussion if their first requests do not yield the information they need (MP1). It also allows them to refine the language they use and ask increasingly more precise questions until they get the information they need (MP6).

Here is an image of the cards for reference:

<p>A Garden and a Playground Problem Card 1</p> <p>A gardener has a rectangular garden. She found its area in square meters.</p>  <p>What is the perimeter of the garden?</p>	<p>A Garden and a Playground Data Card 1</p> <ul style="list-style-type: none"> • The area of the garden is 48 square meters. • The longer side is 2 meters longer than the shorter side. • One side of the garden is 8 meters.
<p>A Garden and a Playground Problem Card 2</p> <p>A school has a rectangular playground. A teacher found its perimeter and area.</p>  <p>What is the area of the playground?</p>	<p>A Garden and a Playground Data Card 2</p> <ul style="list-style-type: none"> • The perimeter of the playground is 38 meters. • The longer side is an even number of meters. • The shorter side of the playground is 7 meters.

Access for Students with Disabilities

Representation: Internalize Comprehension. Synthesis: Invite students to identify which details were needed to solve the problem. Display the sentence frame, “The next time I use the area of a rectangle to find the perimeter, I will look for”

Supports accessibility for: Memory, Visual-Spatial Processing

Instructional Routines

MLR4 Information Gap

Materials to Copy

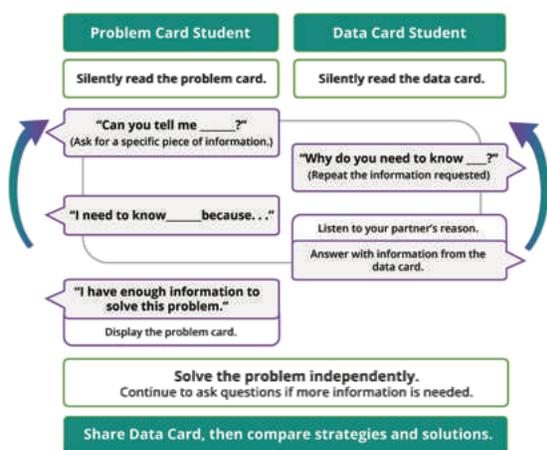
Info Gap: A Garden and a Playground (groups of 2)

Required Preparation

- Each group of 2 will need a copy of the 2 data and problem card sets. Keep set 1 separate from set 2.

Student-facing Task Statement

Your teacher will give you either a problem card or a data card. Do not show or read your card to your partner.



Pause here so your teacher can review your work.

Ask your teacher for a new set of cards and repeat the activity, trading roles with your partner.

Student Responses

Problem Card 1: 28 meters. Sample response: Since I had the area and was missing a side length, I divided 48 by 8 and got 6. Then I added up all the side lengths and got 28.

Problem Card 2: 84 square meters. Sample response: Since two of the sides are 7 meters, I can subtract 14 from 38 to get 24. The other two sides are the same length, and $24 \div 2 = 12$. So 12×7 is the area of the playground. $10 \times 7 = 70$ and $2 \times 7 = 14$, so the area is $70 + 14$, which is 84.

Launch

- Groups of 2

MLR4 Information Gap

- Display the task statement, which shows a diagram of the info gap structure.
- 1 minute: quiet think time
- Read the steps of the routine aloud.
- "I will give you either a problem card or a data card. Silently read your card. Do not read or show your card to your partner."
- Distribute cards.
- 1–2 minutes: quiet think time
- Remind students that after the person with the problem card asks for a piece of information the person with the data card should respond with "Why do you need to know (restate the information requested)?"

Activity

- 3–5 minutes: partner work time
- After students solve the first problem, distribute the next set of cards. Students switch roles and repeat the process with Problem Card 2 and Data Card 2.

Synthesis

- Share and record responses.
- Display the info gap cards.
- "What do you need to know in order to find the perimeter or area of these rectangles?" (The missing side length.)
- "How did you use the area and one side you knew to find the missing side length?"

- “How did you use the perimeter and one side to find the missing side length?”

Lesson Synthesis

🕒 10 min

“Today we saw some problems that asked us to think about area and perimeter together.”

“How are perimeter and area alike?” (They are both measurements of shapes. We need side lengths to find both the area and perimeter of rectangles.)

“How are they different?” (Perimeter is about distance, so it is measured in length units. Area is about the amount of space within a shape, so it is measured in square units.)

If the different types of units used to measure area and perimeter don’t come up, ask, “How are the units we use to measure area and perimeter different? Why?”

Consider recording students’ ideas in two columns labeled “alike” and “different.”

Suggested Centers

- Can You Draw It? (1–5), Stage 3: Grade 3 Shapes (Addressing)
- Which One? (K–5), Stage 4: Grade 3 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 3: Grade 3 Shapes (Addressing)

Complete Cool-Down

Response to Student Thinking

Students do not determine the amount of fencing Lin will need for her rectangular garden.

Next Day Support

- Before the warm-up, pass back the cool-down and have students work in small groups to make corrections.

Lesson 11: Rectangles with the Same Perimeter

Standards Alignments

Addressing 3.MD.D.8, 3.OA.C.7

Teacher-facing Learning Goals

- Draw rectangles with the same perimeter and different areas.

Student-facing Learning Goals

- Let's explore rectangles with the same perimeter.

Lesson Purpose

The purpose of this lesson is for students to understand that rectangles with the same perimeter do not always have the same area.

In previous lessons, students learned to find the area and perimeter of rectangles. In this lesson, students draw rectangles with a specified perimeter, find their areas, and notice that rectangles with the same perimeter do not always have the same area. Students then draw rectangles with specific perimeter that have different areas.

Access for:

Students with Disabilities

- Engagement (Activity 2)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Number Talk (Warm-up)

Materials to Gather

- Scissors: Activity 2
- Tape: Activity 2

Materials to Copy

- Square Dot Paper Standard (groups of 1): Activity 2

Lesson Timeline

Warm-up	10 min
Activity 1	15 min
Activity 2	20 min

Teacher Reflection Question

Who has been sharing their ideas in class lately? Make a note of students whose ideas have not been featured in class and look for an opportunity for them to share their thinking in tomorrow's lesson.

Lesson Synthesis 10 min

Cool-down 5 min

Cool-down (to be completed at the end of the lesson)

🕒 5 min

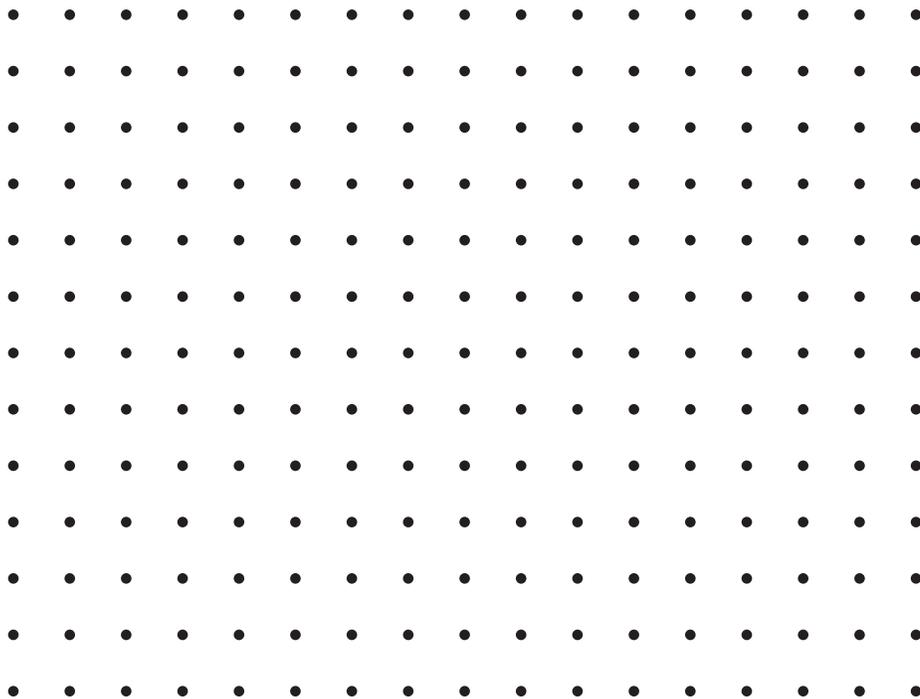
Perimeter of 18

Standards Alignments

Addressing 3.MD.D.8

Student-facing Task Statement

Draw two rectangles that each have a perimeter of 18 units, but different areas. Explain or show your reasoning.

**Student Responses**

Sample response: Students draw rectangles that are 1 by 8 (area: 8 square units), 2 by 7 (area: 14 square units), 3 by 6 (area: 18 square units), or 4 by 5 (20 square units), and explain how the perimeter is the same, but the area is different.

Begin Lesson

Warm-up

🕒 10 min

Number Talk: Multiply to Divide

Standards Alignments

Addressing 3.OA.C.7

The purpose of this Number Talk is to elicit strategies and understandings students have for dividing within 100. These understandings help students develop fluency and will be helpful later in this lesson when students will need to be able to divide fluently within 100.

Instructional Routines

Number Talk

Student-facing Task Statement

Find the value of each expression mentally.

- 5×5
- 10×5
- 2×5
- $85 \div 5$

Student Responses

- 25: I just know it or it's 5 groups of 5.
- 50: I just know it or it's 10 groups of 5.
- 10: I just know it.
- 17: I know that $50 + 25 + 10 = 85$. There are 5 fives in 25, 10 fives in 50, and 2 fives in 10. $5 + 10 + 2 = 17$. So, there are 17 fives in 85.

Launch

- Display one expression.
- "Give me a signal when you have an answer and can explain how you got it."
- 1 minute: quiet think time

Activity

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

Synthesis

- "How did knowing the first 3 facts help you find the value of $85 \div 5$?" (The first 3 products added up to 85, which was the number I was dividing in the last problem. So, I was able to use those to figure out $85 \div 5$.)

Activity 1

🕒 15 min

Perimeter of 16 Units

Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is for students to understand that rectangles with the same perimeter do not necessarily have the same area. In the synthesis, students begin to consider how to systematically draw different rectangles with the same perimeter.

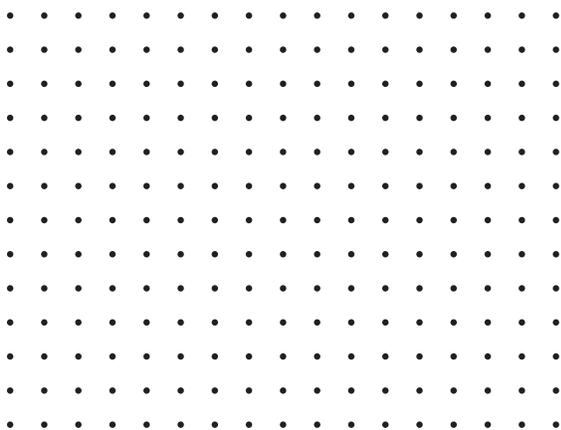
🌐 Access for English Learners

MLR8 Discussion Supports. Synthesis: Provide students with the opportunity to rehearse what they will say with a partner before they share with the whole class.

Advances: Speaking

Student-facing Task Statement

1. Draw as many different rectangles with a perimeter of 16 units as you can.
2. Calculate the area of each rectangle you draw. Explain or show your reasoning.



Student Responses

Sample response:

Launch

- Groups of 2
- “Take a couple of minutes to draw some rectangles that have a perimeter of 16 units.”
- 2–3 minutes: independent work time

Activity

- “Share your rectangles with your partner and see if there are any other rectangles you can think of together. Then, find the area of each rectangle.”
- 6–8 minutes: partner work time
- Monitor for different rectangles students draw.

Synthesis

- Select students to share their rectangles

1. Students draw rectangles that are 7 units by 1 unit, 6 by 2, 5 by 3, and 4 by 4.
2. 7 square units, 12 square units, 15 square units, 16 square units

and to explain how they knew the perimeter was 16 and how they found the area.

- “We just showed that rectangles with a certain perimeter do not always have the same area.”
- “How would you explain to someone how to draw rectangles with a perimeter of 30 that had different areas?” (Choose a length for two of the sides, like 10, and then double that to get 20. There’s 10 left for the other two sides, so each side will be 5. Split 30 in half to get 15. The two different side lengths need to add up to 15, so we can use different pairs of numbers with the sum of 15.)

Activity 2

🕒 20 min

Same Perimeter, Different Area

👤 ↔ 👤 PLC Activity

Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is for students to draw rectangles with the same perimeter and different areas. Students draw a pair of rectangles for each given perimeter, then display their rectangles and make observations about them in a gallery walk.

Students may notice new patterns (MP7) in the rectangles with the same perimeter (for instance, that as two sides each increase by 1 unit, the other two sides each decrease in length by 1 unit). They may also notice that, so far, all the perimeters are even numbers. Students may wonder if it is possible for a perimeter to be an odd number. If these observations arise, consider discussing them in the synthesis.

Access for Students with Disabilities

Engagement: Provide Access by Recruiting Interest. Leverage choice around perceived challenge. Invite students to select to complete 3 of the 5 perimeter problems in task 1.
Supports accessibility for: Organization, Attention, Social-Emotional Skills

Materials to Gather

Scissors, Tape

Materials to Copy

Square Dot Paper Standard (groups of 1)

Required Preparation

- Create 4 visual displays. Each visual display should be labeled with a different perimeter. Use the following perimeters: 12 units, 20 units, 26 units, 34 units).
- Students cut out and tape their rectangles on one of the visual displays during this activity.

Student-facing Task Statement

Your teacher will give you some dot paper for drawing rectangles.

1. For each of the following perimeters, draw 2 rectangles with that perimeter but different areas.
 - a. 12 units
 - b. 20 units
 - c. 26 units
 - d. 34 units
 - e. Choose your own perimeter.
2. Cut out 1 or 2 rectangles you want to share and put them on the appropriate poster. Try to look for rectangles that are different from what other groups have already placed.
3. Gallery Walk: As you visit the posters with your partner, discuss something you notice and something you wonder.

Student Responses

1. Students may draw rectangles that are:
 - a. 1 by 5, 2 by 4, 3 by 3

Launch

- Groups of 2
- Display the visual display labeled with each of the four perimeters in the first problem.
- Give each group 2 sheets of dot paper, scissors, and access to tape.

Activity

- “Work with your partner to complete the first problem.”
- 6–8 minutes: partner work time
- “Choose which rectangles you want to share and put them on the appropriate poster. Try to look for rectangles that are different from what other groups have already placed.”
- 3–5 minutes: partner work time
- Monitor to make sure each visual display has a variety of rectangles.
- When all students have put their rectangles on the posters, ask students to visit the posters with their partner and discuss one thing they notice and one thing they

- b. 1 by 9, 2 by 8, 3 by 7, 4 by 6, 5 by 5
 - c. 1 by 12, 2 by 11, 3 by 10, 4 by 9, 5 by 8, 6 by 7
 - d. 1 by 16, 2 by 15, 3 by 14, 4 by 13, 5 by 12, 6 by 11, 7 by 10, 8 by 9
 - e. Answers vary.
2. No response required.
3. Students may notice:
- We came up with a lot of the same rectangles as others did.
 - There are a lot of rectangles with the same perimeter and different areas.
 - Some perimeters have more rectangles than others.
 - All the rectangles have an even number for their perimeter.
 - For each perimeter, there is a rectangle with a side length of 1, a rectangle with a side length of 2, and one with a side length of 3.

Students may wonder:

- How did they come up with that rectangle?
- What if the perimeter is not an even number? Can we still make different rectangles with that perimeter?

wonder about the rectangles.

- 5 minutes: gallery walk

Synthesis

- “As you visited the posters, what did you notice? What did you wonder?”
- Discuss observations or questions that can reinforce the connections between side lengths, perimeter, and area of rectangles.
- Consider asking:
 - “What perimeter did you and your partner choose to work with when you could choose your own perimeter? Why did you choose that perimeter?”

Lesson Synthesis

🕒 10 min

Refer to the posters from the previous activity.

“How is it possible that many rectangles can have the same perimeter, but not have the same area?” (The perimeter is the distance around the rectangle, it does not determine the amount of space the rectangle covers.)

“How did you know the areas were different? Can you tell by looking at the rectangles whether they have the same area?” (Some you can tell just by looking at them that one takes up more space than the other. I would find the area to be sure. Even if the rectangles look different, they could have the same area.)

Suggested Centers

- Can You Draw It? (1–5), Stage 4: Area and Perimeter (Addressing)

Complete Cool-Down

Response to Student Thinking

Students draw rectangles with an area of 18 square units instead of a perimeter of 18 units.

Next Day Support

- Launch the next day's activity by highlighting important ideas from previous lessons.

Lesson 12: Rectangles with the Same Area

Standards Alignments

Addressing 3.MD.D.8, 3.OA.C.7

Teacher-facing Learning Goals

- Draw rectangles with the same area and different perimeters.

Student-facing Learning Goals

- Let's explore rectangles with the same area.

Lesson Purpose

The purpose of this lesson is for students to understand that rectangles with the same area do not always have the same perimeter.

In previous lessons, students learned to find the area and perimeter of rectangles and saw that rectangles with the same perimeter do not always have the same area. In this lesson, students draw rectangles with a specified area, find their perimeters, and notice that rectangles with the same area do not always have the same perimeter. Students then draw rectangles with specific areas that have different perimeters.

This lesson has a Student Section Summary.

Access for:

Students with Disabilities

- Action and Expression (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Number Talk (Warm-up)

Materials to Gather

- Scissors: Activity 2
- Tape: Activity 2

Materials to Copy

- Square Dot Paper Standard (groups of 1): Activity 2

Lesson Timeline

Warm-up

10 min

Teacher Reflection Question

How is students' prior understanding of area informing their understanding of perimeter and

Activity 1	15 min	area as separate measurements of shapes?
Activity 2	20 min	
Lesson Synthesis	10 min	
Cool-down	5 min	

Cool-down (to be completed at the end of the lesson)

🕒 5 min

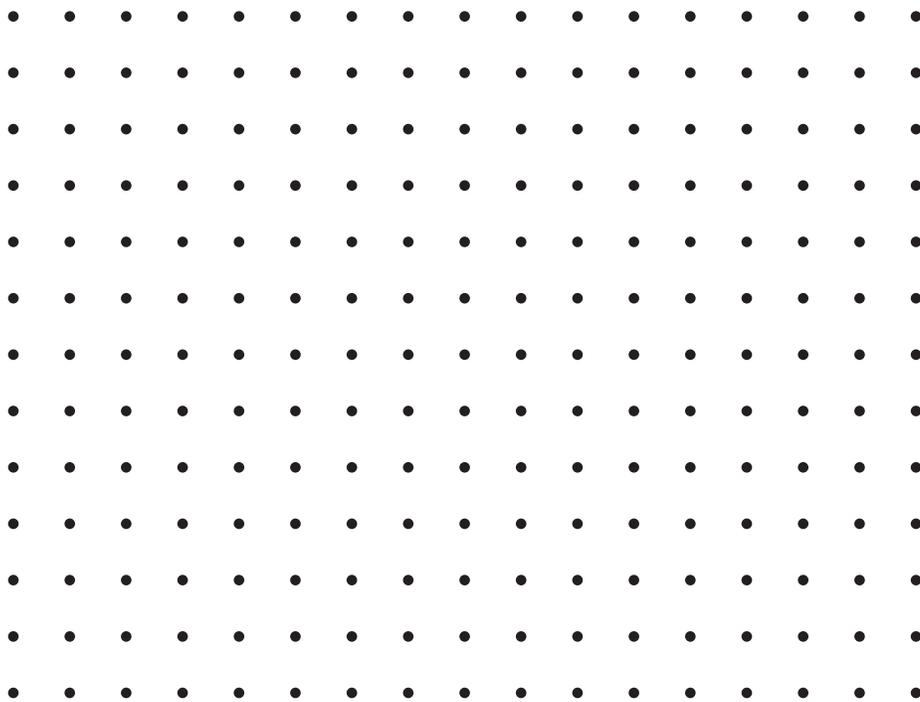
Area of 36

Standards Alignments

Addressing 3.MD.D.8

Student-facing Task Statement

Draw two rectangles that each have an area of 36 square units but different perimeters. Explain or show your reasoning.



Student Responses

Sample response: Students draw rectangles that are 6 by 6 (perimeter: 24 units), 9 by 4

(perimeter: 26 units), 12 by 3 (perimeter: 30 units), or 18 by 2 (perimeter: 40 units), and explain how the area is the same but the perimeter is different.

Begin Lesson

Warm-up

🕒 10 min

Number Talk: Divide in Parts

Standards Alignments

Addressing 3.OA.C.7

The purpose of this Number Talk is to elicit strategies and understandings students have for dividing within 100. These understandings help students develop fluency and will be helpful later in this lesson when students will need to be able to divide fluently within 100.

When students use properties of operations and quotients with a value of 10 to find other quotients, they look for and make use of structure (MP7).

Instructional Routines

Number Talk

Student-facing Task Statement

Find the value of each expression mentally.

- $40 \div 4$
- $60 \div 4$
- $80 \div 4$
- $96 \div 4$

Student Responses

- 10: I just know it.
- 15: I know that 60 is $40 + 20$. I also know that $40 \div 4$ is 10 and $20 \div 4$ is 5, so $60 \div 4$ is $10 + 5$ or 15.

Launch

- Display one expression.
- “Give me a signal when you have an answer and can explain how you got it.”
- 1 minute: quiet think time

Activity

- Record answers and strategy.
- Keep expressions and work displayed.
- Repeat with each expression.

- 20: 80 is double 40 so it's like having 2 groups of 10 for 20.
- 24: The last problem shows $80 \div 4 = 20$. I know that 96 is $80 + 16$ and $16 \div 4 = 4$, so $96 \div 4$ is $20 + 4$ or 24.

Synthesis

- "How does knowing the first fact help you find other facts?"
- Consider asking:
 - "Who can restate ____'s reasoning in a different way?"
 - "Did anyone have the same strategy but would explain it differently?"
 - "Did anyone approach the problem in a different way?"
 - "Does anyone want to add on to ____'s strategy?"

Activity 1

🕒 15 min

Area of 24

Standards Alignments

Addressing 3.MD.D.8, 3.OA.C.7

The purpose of this activity is for students to understand that rectangles with the same area do not necessarily have the same perimeter. The work here reinforces the idea that area and perimeter are two separate measures of shapes. An area of 24 was chosen because it has many factors and is a familiar number to students.

Access for English Learners

MLR8 Discussion Supports. Synthesis: Provide students with the opportunity to rehearse what they will say with a partner before they share with the whole class.

Advances: Speaking

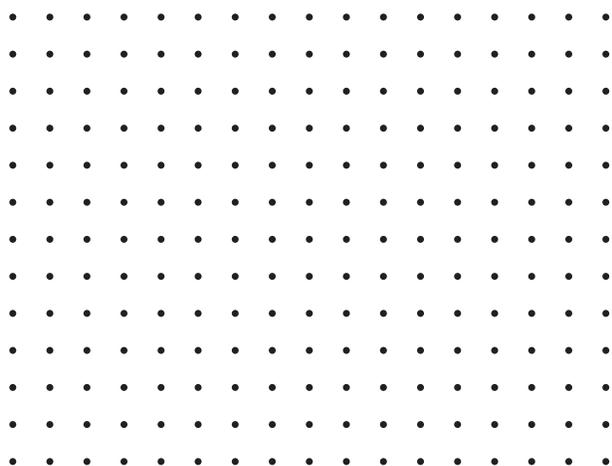
Access for Students with Disabilities

Action and Expression: Develop Expression and Communication. Provide access to blank pre-formatted graph paper to create rectangles.

Supports accessibility for: Fine Motor Skills, Social-Emotional Functioning

Student-facing Task Statement

1. Draw as many different rectangles as you can with an area of 24 square units.
2. Find the perimeter of each rectangle you draw. Explain or show your reasoning.



Student Responses

1. Students may draw rectangles that are 1 unit by 24 units, 2 by 12, 3 by 8, or 4 by 6.
2. Answers vary. Sample responses: 50 units, 28 units, 22 units, 20 units

Launch

- Groups of 2
- “Take a couple of minutes to draw some rectangles that have an area of 24 square units.”
- 2–3 minutes: independent work time

Activity

- “Share your rectangles with your partner and see if there are any other rectangles you can think of together. Then, find the perimeter of each rectangle.”
- 6–8 minutes: partner work time
- Monitor for different rectangles students draw to share in the synthesis.

Synthesis

- Invite students to share the rectangles they drew and to explain how they knew the area was 24.
- “How did you decide what rectangles to draw?” (I thought about what numbers could be multiplied to give 24, like 6 times 4, and made those the side lengths of the rectangle.)
- “We just showed that rectangles with a certain area do not always have the same perimeter.”
- “How would you explain to someone how to draw rectangles with an area of 30 square units but different perimeters?” (Think about pairs of numbers that multiply to 30, use those numbers for the side lengths, and find the perimeter of each.)

Activity 2

🕒 20 min

Same Area, Different Perimeter

Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is for students to draw rectangles with the same area and different perimeters. Students draw a pair of rectangles for each given area, then display their rectangles and make observations about them in a gallery walk.

Materials to Gather

Scissors, Tape

Materials to Copy

Square Dot Paper Standard (groups of 1)

Required Preparation

- Create 4 visual displays. Each visual display should be labeled with one of the following areas: 12 square units, 20 square units, 42 square units, 48 square units.
- Students will cut out and tape their rectangles on to one of the visual displays.

Student-facing Task Statement

Your teacher will give you some paper for drawing rectangles.

1. For each of the following areas, draw 2 rectangles with that area but different perimeters.
 - a. 12 square units
 - b. 20 square units
 - c. 42 square units
 - d. 48 square units
 - e. Choose your own area.
2. Cut out the rectangles you want to share and place them on the appropriate poster. Try to look for rectangles that are different

Launch

- Groups of 2
- Display the visual display labeled with each of the four areas in the first problem.
- Give each group 2 sheets of dot paper, scissors, and access to tape.

Activity

- “Work with your partner to complete the first problem.”
- 6–8 minutes: partner work time
- “Choose which rectangles you want to share and put them on the appropriate poster. Try to look for rectangles that are different from what other groups have already placed.”

from what other groups have already placed.

3. Gallery Walk: As you visit the posters, discuss something you notice and something you wonder.

Student Responses

1. Students may draw rectangles that are:
 - a. 1 by 12, 2 by 6, 3 by 4
 - b. 1 by 20, 2 by 10, 4 by 5
 - c. 1 by 42, 2 by 21, 3 by 14, 6 by 7
 - d. 1 by 48, 2 by 24, 3 by 16, 4 by 12, 6 by 8
 - e. Answers vary.
2. No response required.
3. Students may notice:
 - We came up with a lot of the same rectangles as others did.
 - There are a lot of rectangles with the same area and different perimeters.
 - Some areas have more rectangles than others.
 - All the rectangles have an even number for their area.
 - For each area, there is a rectangle with a side length of 1, a rectangle with a side length of 2, and one with a side length of 4.

Students may wonder:

- How did they come up with that rectangle?
- Is it possible that only one rectangle can be drawn for an area?

- 3–5 minutes: partner work time
- Monitor to make sure each visual display has a variety of rectangles.
- When all students have put their rectangles on the posters, ask students to visit the posters with their partner and discuss one thing they notice and one thing they wonder about the rectangles.
- 5 minutes: gallery walk

Synthesis

- “As you visited the posters, what did you notice? What did you wonder?”
- Discuss observations or questions that can reinforce the connections between side lengths, perimeter, and area of rectangles.
- Consider asking: “What area did you and your partner choose to work with when you could choose your own area? Why did you choose that area?”

Lesson Synthesis

🕒 10 min

“Over the last few lessons, we’ve been learning about area and perimeter.”

“What have you learned about area and perimeter that you want to be sure to remember?” (Rectangles can have the same area and different perimeters. Rectangles can have the same perimeter, but different areas. Area is measured in square units. Perimeter is measured in length units. Perimeter and area are both measures of a shape.)

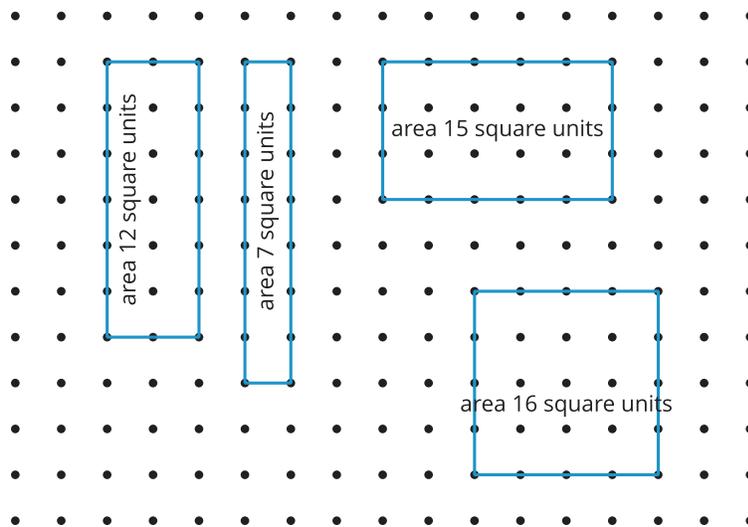
Suggested Centers

- Can You Draw It? (1–5), Stage 4: Area and Perimeter (Addressing)
- Compare (1–5), Stage 4: Divide within 100 (Supporting)
- How Close? (1–5), Stage 5: Multiply to 100 (Supporting)

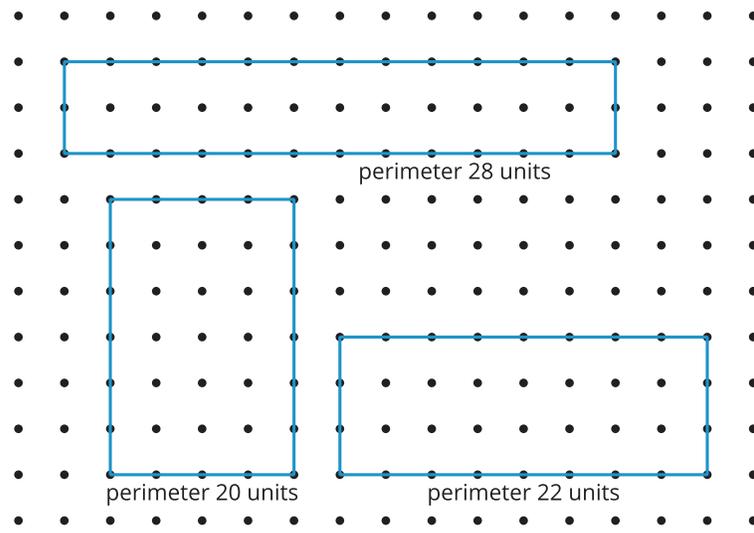
Student Section Summary

In this section, we drew rectangles with the same perimeter and different areas. We also drew rectangles with the same area and different perimeters.

rectangles with a perimeter of 16 units



rectangles with an area of 24 square units



Complete Cool-Down

Response to Student Thinking

Students draw rectangles that have a perimeter of 36 units instead of an area of 36 square units.

Next Day Support

- Launch the next day's activity by highlighting important ideas from previous lessons.

Section D: Design with Perimeter and Area

Lesson 13: Shapes and Play

Standards Alignments

Addressing 3.MD.D.8

Teacher-facing Learning Goals

- Apply geometric understanding to solve problems about parks.

Student-facing Learning Goals

- Let's design a park.

Lesson Purpose

The purpose of this lesson is for students to consider how geometric attributes, perimeter, and area are used when designing a playground.

In previous lessons, students learned how to identify different types of quadrilaterals, find the perimeter of different shapes, and draw shapes with the same area and different perimeters or the same perimeter and different areas. In this lesson, students put all of this together to design a small park with specific features, then describe the area and perimeter of features of the park. Students also solve area and perimeter problems that involve the features of a park.

Access for:

Students with Disabilities

- Action and Expression (Activity 2)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Notice and Wonder (Warm-up)

Materials to Copy

- Square Dot Paper Standard (groups of 1): Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	20 min
Activity 2	15 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

What methods are students most often using to find perimeter and area? What methods do you want students to practice using more frequently?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Possible Perimeters

Standards Alignments

Addressing 3.MD.D.8

Student-facing Task Statement

A rectangular mural is being made for a park that will take up 64 square feet. Give 2 possible perimeters for the mural. Explain or show your reasoning.

Student Responses

Sample responses:

40 feet. A 4 foot by 16 foot rectangle would have an area of 64 square feet and a perimeter of 40 feet. 68 feet because I can multiply 2×32 to get 64, but $2 + 2 + 32 + 32 = 68$.

----- **Begin Lesson** -----**Warm-up**

🕒 10 min

Notice and Wonder: A Park

Standards Alignments

Addressing 3.MD.D.8

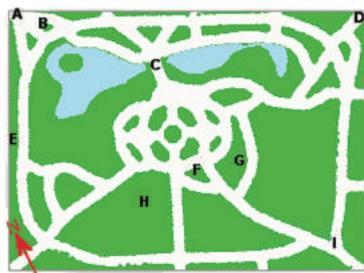
The purpose of this warm-up is to elicit the idea that different shapes are used in the design of park areas, which will be useful when students design a park in a later activity. While students may notice and wonder many things about these images, how different shapes are used in the design of the park is the important discussion point.

Instructional Routines

Notice and Wonder

Student-facing Task Statement

What do you notice? What do you wonder?



Student Responses

Students may notice:

- These both look like the same park, but one is a photograph and one is a map.
- The map doesn't have as much detail as the photograph.
- The park is shaped like a rectangle.
- The park is surrounded by buildings.
- The park has 2 lakes and some buildings.
- There's a circular area in the middle that's been partitioned into 4 parts.

Launch

- Groups of 2
- Display the image.
- "What do you notice? What do you wonder?"
- 1 minute: quiet think time

Activity

- "Discuss your thinking with your partner."
- 1 minute: partner discussion
- Share and record responses.

Synthesis

- "How would it change the look of the park if you could only use quadrilaterals to design it?" (It would be more boxy. There might be some rectangles and rhombuses. You could make it look kind of like it does now, but you wouldn't have any curved lines.)

- There are paths that go through the park and split up different areas.
- The shapes in the park have rounded sides.

Students may wonder:

- What do the letters stand for on the map?
- How many trees are in the park?
- What are the buildings in the park used for?
- Where is this park located?
- Is there a playground in the park?
- How much space does the park take up?

Activity 1

🕒 20 min

Design a Park

Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is to provide students an opportunity to apply what they've learned about perimeter and area to design a small park. Since diagonal lines that connect the dots are not one length unit, students should use vertical and horizontal lines to design the park. When students make and describe their own choices for how they represent real-world objects, they model real-world problems with mathematics (MP4).

Access for English Learners

MLR8 Discussion Supports. Synthesis: At the appropriate time, give students 2–3 minutes to make sure they can explain parts of their display. Invite students to rehearse with their partner what they will say about their display.

Advances: Speaking, Conversing, Representing

Materials to Copy

Square Dot Paper Standard (groups of 1)

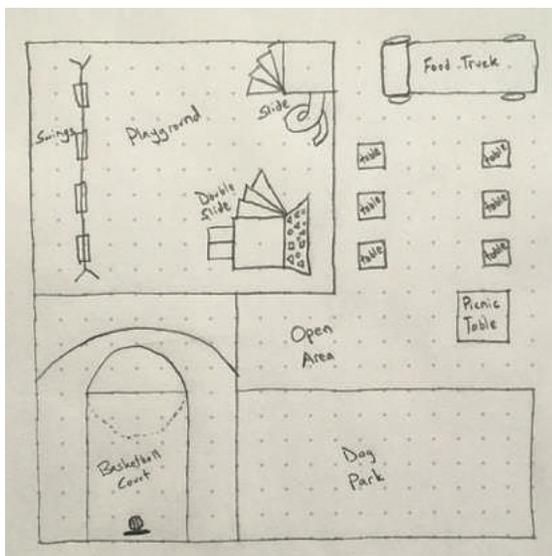
Student-facing Task Statement

Your teacher will give you some dot paper for drawing.

- The distance from 1 dot to another horizontally or vertically represents 1 yard. Connect dots on the grid horizontally or vertically to design a small park that has 5 of these features:
 - basketball court
 - soccer goal
 - swings
 - a slide
 - an open area
 - picnic table
 - water play area
 - skate park
 - a feature of your choice
- Describe the area and the perimeter of 3 features in the park.

Student Responses

- Sample response:



- Sample responses:

Launch

- Groups of 2
- "You're going to design a small park. What are some features that can be in a park?" (a playground, picnic benches, walking trails)
- Give each student a sheet of dot paper.
- "Take some time to read over the directions and choose some of the features you will include in your design."
- 1 minute: quiet think time

Activity

- "Work independently to design your small park."
- 5–7 minutes: independent work time
- "You can work with a partner or small group for the last few minutes or continue working on your own. Even if you choose to work alone, be available if your partner wants to think through something together."
- 3–5 minutes: partner, small group, or independent work time

Synthesis

- Pair students up with a new partner.
- "Share your design with your partner. Be sure to ask questions about your partner's design and answer questions about your design."
- 2–3 minutes: partner discussion
- Repeat cycles of pairing students up with new partners to share their park design as time allows.

- The area to eat by the food truck is 6 yards by 8 yards, so it has an area of 48 square yards. It has a perimeter of 28 yards.
- The area of the basketball court is 8 yards by 10 yards. It has an area of 80 square yards and a perimeter of 36 yards.

Activity 2

🕒 15 min

Park Problems

Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is for students to solve problems that involve perimeter and area (MP2). The problems that students solve involve features that could be present in a park.

🕒 Access for Students with Disabilities

Action and Expression: Develop Expression and Communication. Synthesis: Identify connections between strategies that result in the same outcomes but use differing approaches. *Supports accessibility for: Conceptual Processing, Visual-Spatial Processing.*

Student-facing Task Statement

Solve each problem. Explain or show your reasoning.

1. A rectangular playground is 6 yards by 14 yards.
 - a. How much fencing is needed to fence in the playground?
 - b. What is the area of the playground?
 - c. Give another pair of side lengths that

Launch

- Groups of 2

Activity

- "Work independently to solve the problems."
- 5–7 minutes: independent work time
- Monitor for drawings of different dimensions that students create for the

would have the same perimeter, but a different area.

2. A rectangular open area in a park is going to have an area of 48 square yards. Give 2 possible perimeters for the rectangular area.

Student Responses

1.
 - a. 40 yards. Sample response:
 $6 + 14 = 20$. $2 \times 20 = 40$.
 - b. 84 square yards. Sample response:
 $6 \times 10 = 60$. $6 \times 4 = 24$.
 $60 + 24 = 84$.
 - c. Sample response: 15 yards by 5 yards
2. Sample response: A rectangle that is 3 yards by 16 yards would have a perimeter of 38 yards. A rectangle that is 4 yards by 12 yards would have a perimeter of 32 yards.

last problem to share during the synthesis.

- “Discuss your solutions to the problems and how you solved them with your partner.”
- 2–3 minutes: partner discussion

Synthesis

- For the last problem, display 3–4 different sets of dimensions that students used to find the possible perimeters, one at a time.
- For each set of dimensions, ask:
 - “How do we know this rectangle has an area of 48 square yards?” (If you multiply 6×8 , it’s 48. I multiplied 2×24 by multiplying 2×20 , then 2×4 and adding the products together to get 48.)
 - “What’s the perimeter of this rectangle? Explain your reasoning.” (I doubled the short sides, then doubled the long sides and added them together. I added the short side and the long side, then doubled the amount.)

Lesson Synthesis

🕒 10 min

“What did you and your partner notice about the different perimeters that can be created with rectangles that have the same area?” (Even though the area of the rectangles was the same, they looked really different. Rectangles with the same areas can have really different perimeters.)

Suggested Centers

- Can You Draw It? (1–5), Stage 4: Area and Perimeter (Addressing)
- Compare (1–5), Stage 4: Divide within 100 (Supporting)
- How Close? (1–5), Stage 5: Multiply to 100 (Supporting)

Complete Cool-Down

Response to Student Thinking

Students give dimensions that would have the same perimeter and different areas.

Next Day Support

- During the launch of the next day's activity, highlight important ideas from the previous lesson.

Lesson 14: Wax Prints

Standards Alignments

Addressing 3.G.A.1, 3.MD.D.8

Teacher-facing Learning Goals

- Apply geometric understanding to solve problems about wax prints.

Student-facing Learning Goals

- Let's analyze and make wax prints.

Lesson Purpose

The purpose of this lesson is for students to consider how geometric attributes, perimeter, and area are used to design and use wax print fabric.

In previous lessons, students learned how to identify different types of quadrilaterals and solve problems involving area and perimeter. In this lesson students put all of their learning together to analyze geometric attributes of wax prints, then design a wax print of their own with specific constraints about the shapes they need to use. Then, students use what they know about area and perimeter to solve problems that involve wax print fabric.

Access for:

Students with Disabilities

- Action and Expression (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

MLR4 Information Gap (Activity 2), Notice and Wonder (Warm-up)

Materials to Gather

- Colored pencils, crayons, or markers: Activity 1

Materials to Copy

- Square Dot Paper Standard (groups of 1): Activity 1
- Info Gap: The Bundle (groups of 2): Activity 2

Lesson Timeline

Warm-up 10 min

Teacher Reflection Question

What do your students think it means to be

Activity 1	20 min
Activity 2	20 min
Lesson Synthesis	5 min
Cool-down	5 min

good at math? How are you helping them change negative impressions they might have about their ability to reason mathematically?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

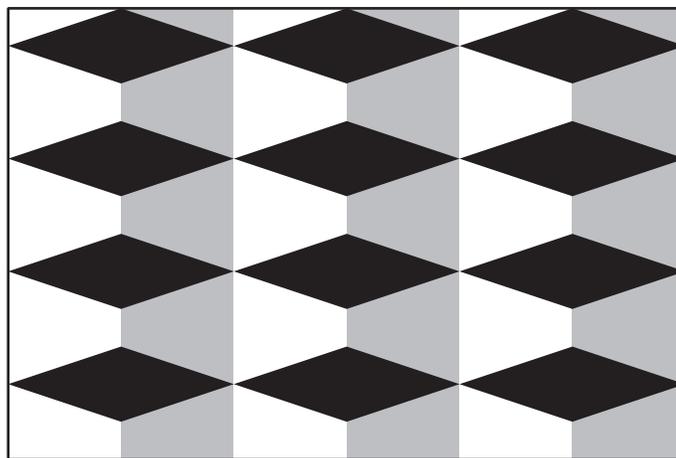
Quadrilaterals in a Pattern

Standards Alignments

Addressing 3.G.A.1, 3.MD.D.8

Student-facing Task Statement

1. Describe the quadrilaterals that were used in this pattern.



2. If the image of the pattern is a rectangle with side lengths of 9 inches by 6 inches, what is the perimeter? Explain your reasoning.

Student Responses

1. Samples responses: There are quadrilaterals in white and gray that don't have any right angles. The black quadrilaterals are rhombuses. The grey shapes and the white shapes are quadrilaterals that have 2 equal sides. They are not rectangles, rhombuses, or squares. It looks like there are tall skinny rectangles that are shaded white and gray behind the black rhombuses.

2. 30 inches. I added 9 plus 6 to get 15, then multiplied by 2 since there would be another set of sides that were 9 inches and 6 inches.

----- **Begin Lesson** -----

Warm-up

🕒 10 min

Notice and Wonder: Textiles

Standards Alignments

Addressing 3.G.A.1

The purpose of this warm-up is to elicit the idea that there are many shapes that are visible in wax prints, which will be useful when students design a wax print in a later activity.

Instructional Routines

Notice and Wonder

Student-facing Task Statement

What do you notice? What do you wonder?



Launch

- Groups of 2
- Display the image.
- “What do you notice? What do you wonder?”
- 1 minute: quiet think time

Activity

- “Discuss your thinking with your partner.”
- 1 minute: partner discussion
- Monitor for a student who mentions how the shapes repeat in the patterns to share.
- Share and record responses.

Student Responses

Students may notice:

- There is lots of fabric.
- There are lots of different patterns on the fabric.
- The shapes in the patterns repeat to cover the fabric.
- The woman is looking at one of the patterns.
- The pattern she is looking at has triangles on it.
- The woman's sleeve has quadrilaterals on it.

Students may wonder:

- Is the woman going to buy some fabric?
- What can you make from fabric like this?
- What other shapes can be used to make fabric?
- Why is there so much fabric?

Synthesis

- "What types of shapes do we see in all the different patterns?" (I see squares on the woman's shirt. I see triangles on the yellow fabric. I see circles in several of the patterns. I think I see rhombuses in the light green pattern at the bottom.)

Activity 1

🕒 20 min

Create a Wax Print Pattern

👤 ↔ 👤 PLC Activity

Standards Alignments

Addressing 3.G.A.1

The purpose of this activity is for students to apply what they've learned about quadrilaterals to design a wax print pattern. First, students analyze wax prints that have quadrilaterals incorporated into the pattern. Then, students design their own wax print that incorporates rhombuses, rectangles, or squares and a quadrilateral that doesn't belong to any of these subcategories.

Access for English Learners

MLR8 Discussion Supports. Synthesis: During group presentations, invite the student(s) who are not speaking to follow along and point to the corresponding parts of the display.

Advances: Speaking, Representing

Access for Students with Disabilities

Action and Expression: Internalize Executive Functions. To support working memory, provide students with access to sticky notes or mini whiteboards.

Supports accessibility for: Memory, Organization

Materials to Gather

Colored pencils, crayons, or markers

Student-facing Task Statement

Your teacher will give you some dot paper for drawing.

1. Use the dot paper to design your own wax print pattern. Your pattern should:
 - a. use a rhombus, rectangle, or square
 - b. use a quadrilateral that is not a rhombus, rectangle, or square
 - c. have each shape repeat at least 5 times
2. Color the pattern in a way that highlights the shapes you chose or choices you made.



Student Responses

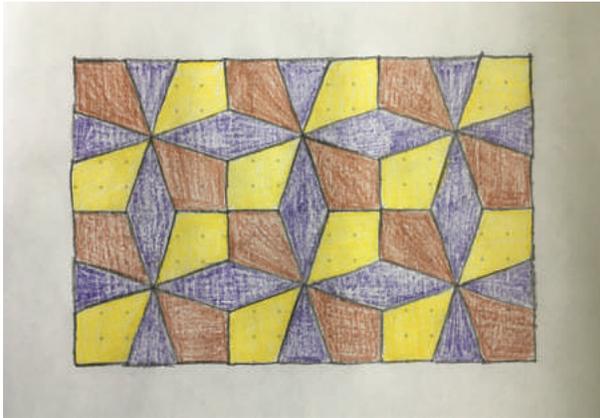
Sample responses:

Materials to Copy

Square Dot Paper Standard (groups of 1)

Launch

- Groups of 2
- Display the image.
- “Today’s lesson is going to focus on African wax prints. African wax prints are colorful cotton fabrics commonly used for clothing in West Africa. Take a minute to think about the pattern. What do you notice? What do you wonder?” (Students may notice: The pattern is colorful. There are rhombuses in the pattern. There are triangles in the pattern. There are quadrilaterals that aren’t rhombuses, rectangles, or squares in the pattern. Students may wonder: How do they make these patterns? What other shapes could be used to make these patterns? What types of clothing are made with this cloth? Where can you buy this type of fabric?)
- 1 minute: partner discussion
- Share responses.
- “You’re going to create your own wax print pattern. Independently read over the directions and think about how you’ll



create your pattern.”

- 2–3 minutes: quiet think time
- “Are there any questions about how you’ll create your wax print pattern?”
- Answer any questions students have.
- Give each student a sheet of dot paper and colored pencils, crayons, or markers.

Activity

- “Work independently to create your wax print pattern.”
- 5–7 minutes: independent work time
- “You can continue working on your own or work with a partner or small group to finish your pattern. Even if you choose to work alone, be available if your partner wants to think through something together.”
- 3–5 minutes: partner, small group, or independent work time
- Monitor for students who use a rhombus, rectangle, or square in their pattern to highlight in the synthesis. Adjust the synthesis if all shapes aren’t used.

Synthesis

- Display previously selected patterns one at a time.
- For each pattern, ask, “How did this student use rectangles (or rombuses, or squares) in their design?”

Activity 2

🕒 20 min

Info Gap: The Bundle

Standards Alignments

Addressing 3.MD.D.8

This Info Gap activity provides students an opportunity to solve problems involving perimeter and area. The problems involve the context of a bundle of wax print fabric that is shared to make multiple pieces of clothing. The purpose of the launch is to get students thinking about where they've seen bundles of fabric and familiarize them with language that will be used in the problem.

This activity uses MLR4 Information Gap.

The Info Gap structure requires students to make sense of problems by determining what information is necessary, and then to ask for information they need to solve it. This may take several rounds of discussion if their first requests do not yield the information they need (MP1). It also allows them to refine the language they use and ask increasingly more precise questions until they get the information they need (MP6).

Here is an image of the cards for reference:

<p>The Bundle Problem Card 1</p> <p>A bundle of wax print cloth is purchased. Some is used to make a head wrap and some is used to make a lapa. The rest goes to the tailor to make a shirt.</p> <p>How much wax print cloth goes to the tailor to make a shirt?</p>	<p>The Bundle Data Card 1</p> <ul style="list-style-type: none"> • The cloth in the bundle is a rectangle. • The cloth in the bundle is 18 feet by 4 feet. • The head wrap is made from a rectangle of cloth that is 2 feet by 6 feet. • The lapa is made from a rectangle of cloth that is 7 feet by 4 feet.
<p>The Bundle Problem Card 2</p> <p>Ribbon is sewn around the perimeter of the lapa and the bottom of the shirt.</p> <p>How much ribbon is needed altogether to decorate the lapa and the shirt?</p>	<p>The Bundle Data Card 2</p> <ul style="list-style-type: none"> • The piece of cloth used for the lapa is a rectangle. • The piece of cloth used for the lapa is 7 feet by 4 feet. • The bottom of the shirt is 3 feet long.

Instructional Routines

MLR4 Information Gap

Materials to Copy

Info Gap: The Bundle (groups of 2)

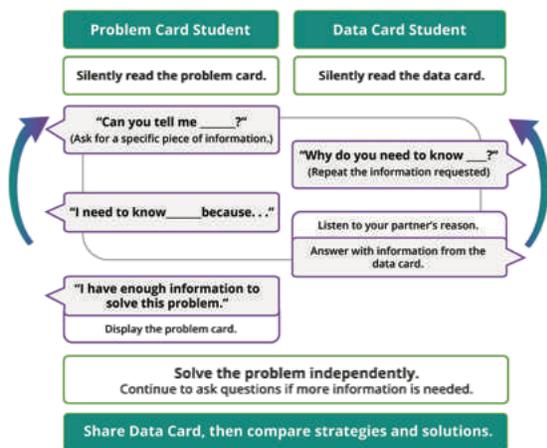
Required Preparation

- Each group of 2 students will need a copy of the 2 data and problem card sets. Keep set 1 separate from set 2.

Student-facing Task Statement



Your teacher will give you either a problem card or a data card. Do not show or read your card to your partner.



Pause here so your teacher can review your work. Ask your teacher for a new set of cards

Launch

- Groups of 2
- Display the image.
- "Once wax print fabric is created, it's sold in bundles and used to make clothing like head wraps and lapas. The second and third images show a lapa, which is a wrap skirt made from a rectangular piece of cloth. Have you seen bundles of fabric like this before? If so, where?"
- Share responses.

MLR4 Information Gap

- Display the task statement, which shows a diagram of the Info Gap structure.
- 1–2 minutes: quiet think time
- Read the steps of the routine aloud.
- "I will give you either a problem card or a data card. Silently read your card. Do not read or show your card to your partner."
- Distribute the cards.
- 1–2 minutes: quiet think time
- Remind students that after the person with the problem card asks for a piece of information, the person with the data card person should respond with, "Why do you need to know (restate the information requested)?"

Activity

- 3–5 minutes: partner work time

and repeat the activity, trading roles with your partner.

Student Responses

Problem Card 1:

32 square feet. Sample response: I multiplied 4×18 to get the area of the fabric in the bundle. This was 72 square feet. Then, I subtracted 12 square feet from 72 for the head wraps. This gave me 60 square feet. Then, I subtracted 28 square feet for the lapa. This left me with 32 square feet to go to the tailor.

Problem Card 2:

25 feet. Sample response: The lapa is 7 feet by 4 feet so I knew to go around it I would need to double 7, then double 4 and add them together. So, I added $14 + 8$ to get 22 feet, then added 3 to get 25.

- After students solve the first problem, distribute the next set of cards. Students switch roles and repeat the process with Problem Card 2 and Data Card 2.

Synthesis

- “What kinds of questions were the most useful to ask?”
- “Were there any questions you weren’t sure how to answer?”
- “What were the important quantities to know to solve this problem?”
- For each problem, ask, “Was this problem related to perimeter or area? How do you know?” (I knew the first problem was area because it was asking about square units, which is how we measure area. I knew the last problem was about perimeter because it was about the ribbon going around the edge of the lapa.)

Lesson Synthesis

 5 min

“Today, we learned about how shapes can be used in fabric designs and how fabric can be used to make clothing. What ways have you seen shapes in designs or used fabric to make something?” (Lots of patterns in fabric have quadrilaterals. For example, plaid has rectangles and squares. Fabric for head wraps is cut in the shape of a rectangle. Fabric for pockets is often in the shape of a rectangle.)

“How can area and perimeter be used when making something out of fabric?” (The area can be used to tell you how much fabric you have. Area tells you how much you can cover with the fabric. Perimeter is used if you want to surround the fabric with something like ribbon or lace.)

Suggested Centers

- Can You Draw It? (1–5), Stage 4: Area and Perimeter (Addressing)
- Compare (1–5), Stage 4: Divide within 100 (Supporting)
- How Close? (1–5), Stage 5: Multiply to 100 (Supporting)

Complete Cool-Down

Response to Student Thinking

Students only describe one of the shapes in the pattern or only describe one attribute of each shape.

Next Day Support

- Before the warm-up, select a student's cool-down from the previous lesson (name anonymous). Ask students to identify what the student did well and what the student needs to do to improve the cool-down.

Lesson 15: Design Your Own Robot

Standards Alignments

Addressing 3.MD.D.8

Teacher-facing Learning Goals

- Apply geometric understanding to solve problems about robots.

Student-facing Learning Goals

- Let's use perimeter and area to design robots.

Lesson Purpose

The purpose of this lesson is for students to draw rectangles with specified perimeters to create a robot.

In previous lessons, students used geometric understanding to solve problems involving the design of wax prints and parks. In this lesson, students create a robot as they draw parts with specified perimeters. Students then find the area of robot's body parts they drew and consider different areas that can be drawn with the same perimeter. If time allows, students can color their robots to highlight their mathematical ideas. When students recognize mathematical features of objects in the real world, they model with mathematics (MP4).

This lesson has a Student Section Summary.

Access for:

Students with Disabilities

- Engagement (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

What Do You Know About ____? (Warm-up)

Materials to Gather

- Tape: Activity 1

Materials to Copy

- Square Dot Paper Standard (groups of 1): Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	35 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

As you finish up this unit, reflect on the norms and activities that have supported each student in learning math. How have you seen yourself grow as a teacher? What are the things you most want to work on as you head into the final unit of the year?

Cool-down (to be completed at the end of the lesson)

🕒 5 min

Reflect on Learning About Perimeter

Standards Alignments

Addressing 3.MD.D.8

Student-facing Task Statement

Which lesson about shapes and perimeter was your favorite? Why?

Student Responses

Sample responses: I liked the lesson where we sorted shapes because it was fun trying to get someone to guess how I sorted them. I liked the lesson on having the same perimeter and different areas because I didn't know that was possible before. I liked designing the wax print because we were able to use math to do art.

----- **Begin Lesson** -----**Warm-up**

🕒 10 min

What Do You Know About Area and Perimeter?

Standards Alignments

Addressing 3.MD.D.8

The purpose of this What Do You Know About is to invite students to share what they know about and how they can represent area and perimeter.

Instructional Routines

What Do You Know About ____?

Student-facing Task Statement

What do you know about area and perimeter?

Student Responses

Sample responses:

- Perimeter is the distance around a shape.
- Area is the amount of space that a shape covers.
- Perimeter is the sum of all the side lengths of a shape.
- You multiply the side lengths to find the area of a rectangle.
- Perimeter is measured in length units.
- Area is measured in square units.
- Perimeter is not the same as area.
- Perimeter and area are measurements of a shape.

Launch

- Display the words area and perimeter.
- “What do you know about area and perimeter?”
- 1 minute: quiet think time

Activity

- Record responses.
- “How are area and perimeter different?”

Synthesis

- “What strategies do you have for finding the area of a shape and the perimeter of a shape?” (To find the area of a rectangle, I multiply the side lengths. For perimeter, I just add up all the side lengths. I like to check for sides that are the same length because then you can multiply or make the calculation easier.)
- Consider asking:
 - “What connections do you see between different answers?”

Activity 1

🕒 35 min

Create Your Own Robot

Standards Alignments

Addressing 3.MD.D.8

The purpose of this activity is for students to draw rectangles with specified perimeters to create their own robot. Students practice with perimeter and also find the area of their robots' body parts in preparation for discussion during the gallery walk, which centers around the different areas that can be created with rectangles that have the same perimeter. Students can choose to work independently, with a partner, or in a small group.

Access for English Learners

MLR8 Discussion Supports. Before presentations begin, remind students to use words such as area, perimeter, units, and square units.

Advances: Speaking, Representing

Access for Students with Disabilities

Engagement: Develop Effort and Persistence. Chunk this task into more manageable parts. Check in with students to provide feedback and encouragement after each chunk.

Supports accessibility for: Social-Emotional Functioning, Organization

Materials to Gather

Tape

Materials to Copy

Square Dot Paper Standard (groups of 1)

Required Preparation

- Students will need to tape together at least 2 sheets of the square dot paper to have space for their robot.

Student-facing Task Statement

1. Create your own robot with these specifications. Explain or show your work so it is clear your robot meets the required specifications.
 - a. Each body part must be a rectangle.
 - b. Head: perimeter of 36 units
 - c. Neck: perimeter of 8 units
 - d. Body: perimeter of 64 units

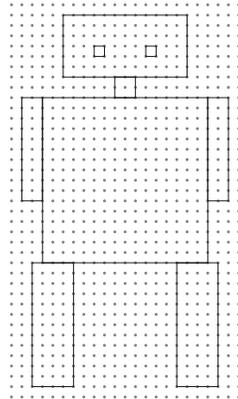
Launch

- Groups of 1–4
- “Take a minute to read the directions for creating your own robot out of rectangles.”
- 1 minute: quiet think time
- Answer any questions.
- Give each student 2 sheets of dot paper and a piece of tape. Have them tape the sheets together.

- e. Each arm: perimeter of 24 units
 - f. Each leg: perimeter of 32 units
 - g. Include one more rectangular feature of your choice on your robot.
2. Find the area of each of your robot's body parts.
 3. Find the total area of your robot.
 4. Gallery Walk: As you visit the robots with your partner, discuss the different areas that can be created with rectangles that have the same perimeter.

Student Responses

1. Sample response:



2. Answers vary.
3. Answers vary.
4. Sample response: We can create a lot of different-looking robots because there are multiple rectangles we can draw for the same perimeter. Some rectangles are close to squares and some are longer and more narrow.

Activity

- 20–25 minutes: independent, partner, or small-group work time

Synthesis

- Display the robots around the room.
- Have half of the students stand at their robot to share their ideas or answer questions as the other students visit their robot.
- Have the other half of the class visit their classmates' robots with a partner.
- 5 minutes: partner work time
- Switch student roles and repeat.

Lesson Synthesis

🕒 10 min

“Over the last three lessons we’ve used shapes, perimeter, and area to design fabric patterns, parks, and robots. What are some other things you are interested in designing that could use shapes, perimeter, and area?” (I would like to design a building which would use lots of different shapes,

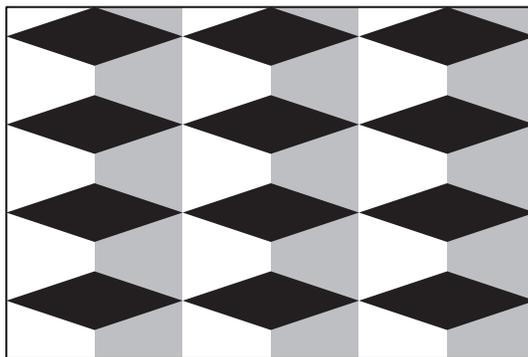
perimeter, and area. I would like to design cars which would involve curved shapes that are solid. I would like to design clothing which would involve shapes and area.)

Suggested Centers

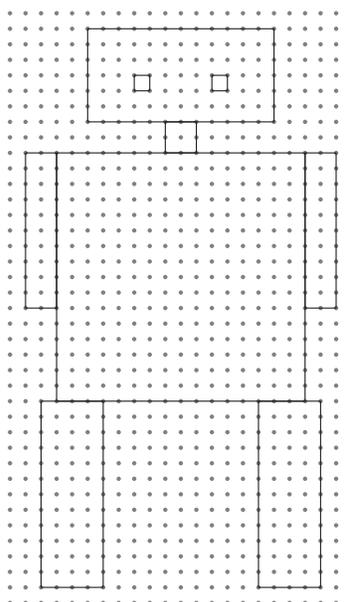
- Can You Draw It? (1-5), Stage 4: Area and Perimeter (Addressing)
- Compare (1-5), Stage 4: Divide within 100 (Supporting)
- How Close? (1-5), Stage 5: Multiply to 100 (Supporting)

Student Section Summary

In this section we reasoned about shapes to design wax prints, a park, and a robot.



Also, we solved problems involving area and perimeter.



----- **Complete Cool-Down** -----

Response to Student Thinking

Students want to share their favorite lesson with a partner.

Next Day Support

- Before the next day's warm-up, pair students up to discuss their responses.

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Family Support
Materials

Family Support Materials

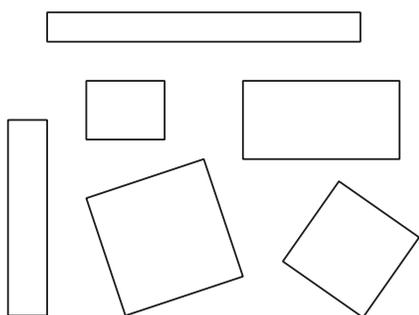
Two-dimensional Shapes and Perimeter

In this unit, students reason about attributes (features) of shapes and learn about perimeter.

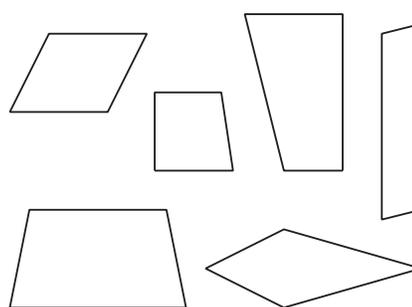
Section A: Reason with Shapes

In this section, students describe, compare, and sort a variety of shapes. Students think about ways to sort triangles and quadrilaterals into more specific categories based on their attributes. They see that triangles and quadrilaterals can be classified and named based on their sides (whether some sides are the same length) and angles (whether they have right angles).

These are rectangles.



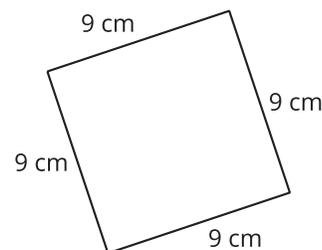
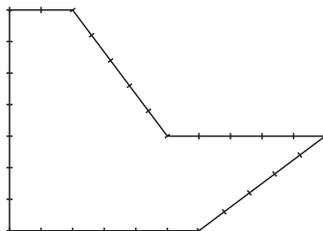
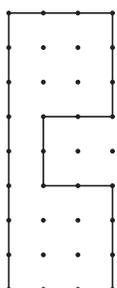
These are not rectangles.



Students see that a shape can have more than one name if it has the attributes that define different shapes. For example, a shape that is a square is also a rhombus and a rectangle.

Section B: What is Perimeter?

In this section, students learn that perimeter is the distance around a shape. They first find perimeter by counting or adding the units of length on each side of a shape. Later, they find the perimeter of shapes whose sides are labeled with lengths.

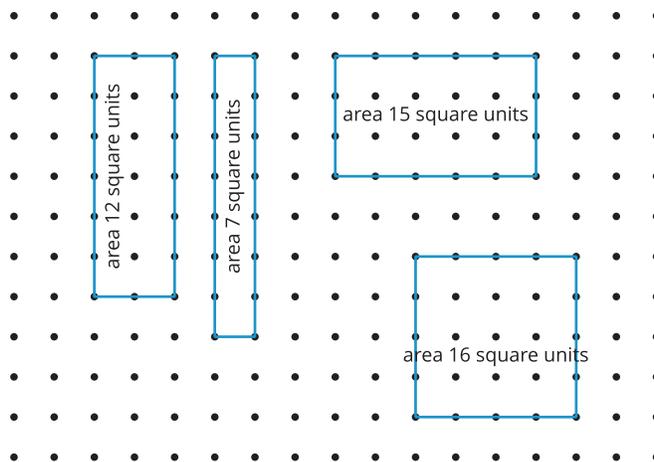


Students also draw shapes with a specified perimeter and see that different shapes can have the same perimeter.

Section C: Expanding on Perimeter

In this section, students solve problems that involve both area and perimeter. They draw rectangles with the same area and different perimeters, and rectangles with the same perimeter and different areas.

For example, the rectangles in the image all have a perimeter of 16 units, but they have different areas.



Section D: Design with Perimeter and Area

In this section, students apply what they've learned about geometric shapes, perimeter, and area to solve design problems. They design a park that has certain components, a West African wax print pattern with certain shapes, and a robot that meet certain requirements.



Try it at home!

Near the end of the unit, ask your student to find:

- these shapes around the house: a rhombus, a rectangle, a square, and a quadrilateral that isn't a rhombus, rectangle, or square
- the area and perimeter of a rectangle in the house

Questions that may be helpful as they work:

- What kind of quadrilateral is this? How do you know?
- Are you measuring area or perimeter? How do you know?

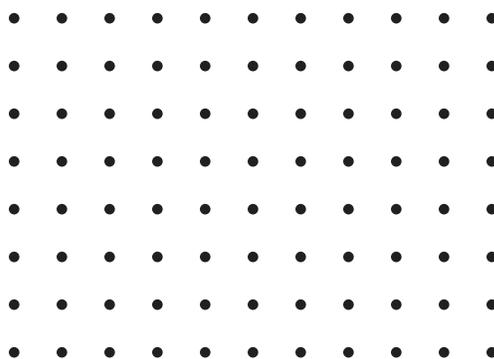
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Unit Assessments

Check Your Readiness A, B, C and D
End-of-Unit Assessment

Two-dimensional Shapes and Perimeter: Section A Checkpoint

1. Draw a quadrilateral that is not a rectangle. Explain why your shape is not a rectangle.



2. Select all the rhombuses.

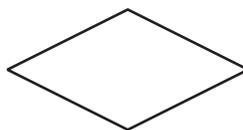
A.



B.



C.

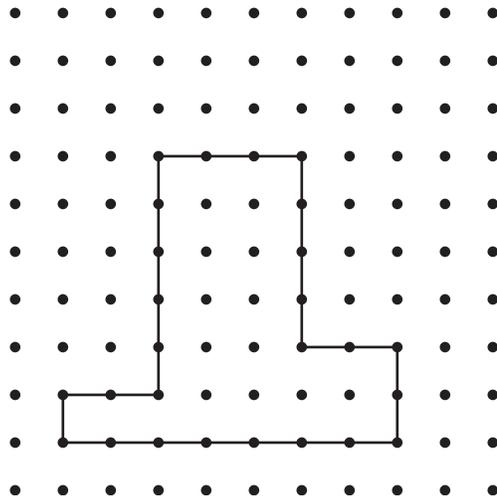


D.

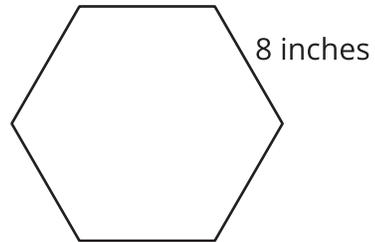


Two-dimensional Shapes and Perimeter: Section B Checkpoint

1. Find the perimeter of the shape.



2. All sides of the hexagon have the same length. What is the perimeter of the hexagon?
Explain or show your reasoning.



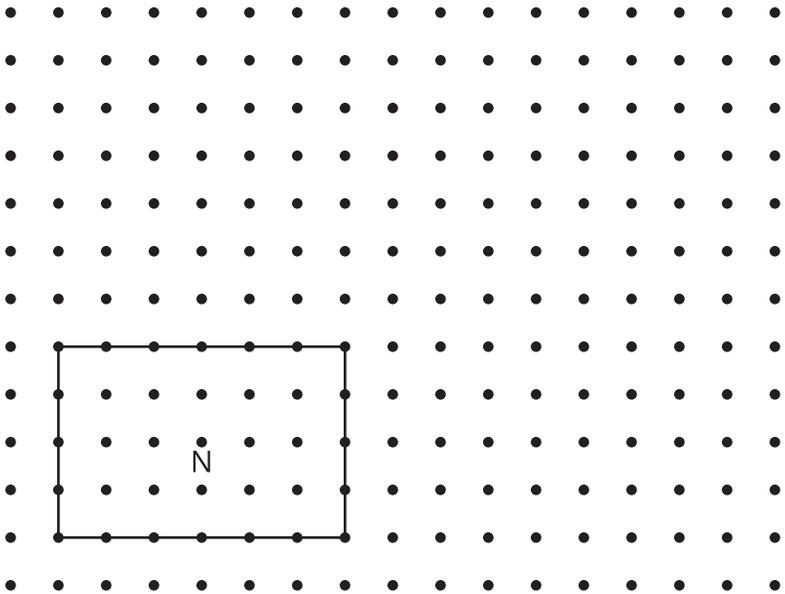
3. Tyler's rectangular room has a total perimeter of 54 feet. The length of Tyler's room is 13 feet. What is the width of the room? Explain or show your reasoning.

Two-dimensional Shapes and Perimeter: Section C Checkpoint

1. A town is building a rectangular playground with fencing all around it. The area of the playground is 99 square yards. One side of the playground needs 11 yards of fencing.

How much fencing is needed to enclose the entire playground? Explain or show your reasoning.

2. a. Draw a rectangle that has the same perimeter as rectangle N but has a different area. Label it P. What is the area of P?



b. Draw a rectangle that has the same area as rectangle N but has a different perimeter. Label it Q. What is the perimeter of Q?

Two-dimensional Shapes and Perimeter: Section D Checkpoint

1. A rectangular garden has an area of 21 square yards. What could be the side lengths of the garden? Explain or show your reasoning.

2. Lin drew a rectangle with a perimeter of 34 centimeters. The width of the rectangle is 6 cm.

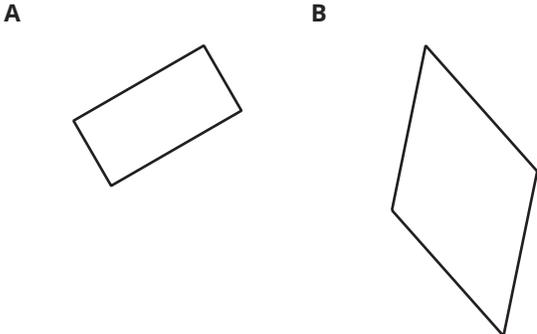
a. What is the length of the rectangle?

b. What is the area of the rectangle?

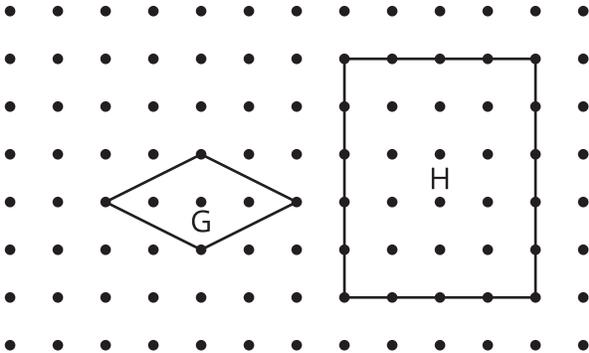
Two-dimensional Shapes and Perimeter: End-of-Unit Assessment

1. How are the two shapes the same?

How are the two shapes different?



2. Select all true statements.

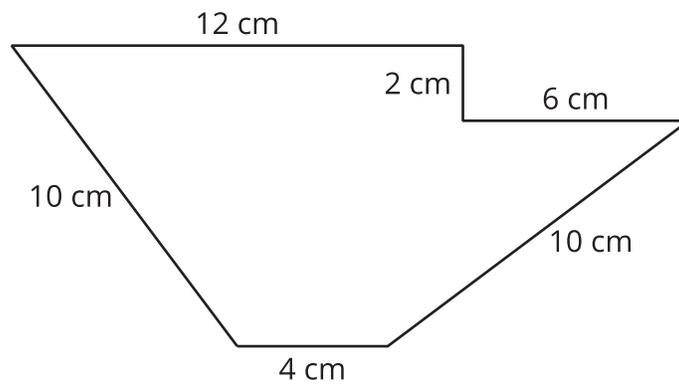


- A. Figure G is a rhombus.
- B. Figure G is a rectangle.
- C. Figure G is a square.
- D. Figure H is a rhombus.
- E. Figure H is a rectangle.
- F. Figure H is a square.

3. Find the perimeter of the rectangle. Explain or show your reasoning.



4. What is the perimeter of the shape?

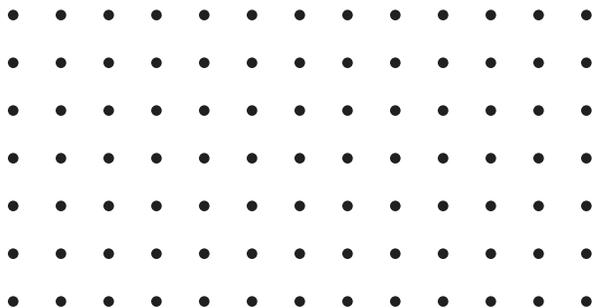


- A. 24 cm
- B. 36 cm
- C. 42 cm
- D. 44 cm

5. A quadrilateral has one side length that is 8 centimeters. Select **all** statements that must be true about the quadrilateral.

- A. If the quadrilateral is a rhombus, then the perimeter is 32 centimeters.
- B. If the quadrilateral is a rectangle, then the perimeter is 32 centimeters.
- C. If the quadrilateral is a square, then the perimeter is 32 centimeters.
- D. If the quadrilateral is a rectangle, then the area is 64 square centimeters.
- E. If the quadrilateral is a square, then the area is 64 square centimeters.

6. a. Draw two rectangles with an area of 12 square units that have different perimeters.



b. Find the perimeter of each rectangle.

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Assessment Answer Keys

Check Your Readiness A, B, C and D
End-of-Unit Assessment

Assessment Answer Keys

Assessment: Section A Checkpoint

Teacher Instructions

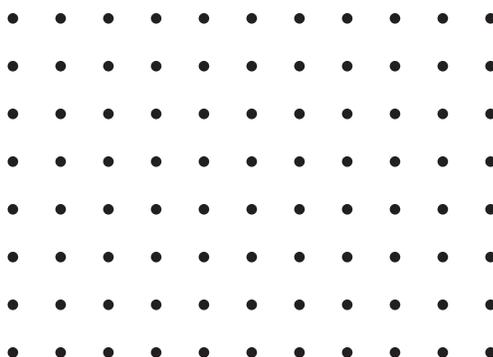
Give students access to rulers.

Problem 1

Goals Assessed

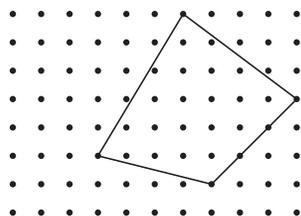
- Reason about shapes and their attributes.

Draw a quadrilateral that is not a rectangle. Explain why your shape is not a rectangle.



Solution

Sample response: This shape is not a rectangle because the angles are not right angles.



Problem 2

Goals Assessed

- Reason about shapes and their attributes.

Select **all** the rhombuses.

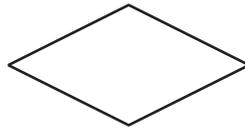
A.



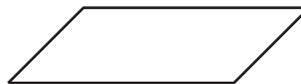
B.



C.

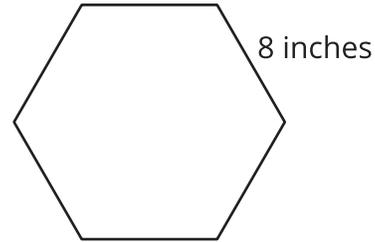


D.



Solution

["B", "C"]



Solution

48 inches. Sample response: $8 + 8 + 8 + 8 + 8 + 8 = 48$

Problem 3

Goals Assessed

- Find the perimeter of polygons, including when all or some side lengths are given.

Tyler's rectangular room has a total perimeter of 54 feet. The length of Tyler's room is 13 feet. What is the width of the room? Explain or show your reasoning.

Solution

14 feet. Sample response: $13 + 13 = 26$ so I know that two sides take up 26 feet. $54 - 26 = 28$ so the other two sides are 28 feet. I can divide by 2 to get their length $28 \div 2 = 14$.

Assessment: Section C Checkpoint

Problem 1

Goals Assessed

- Solve problems involving perimeter and area, in and out of context.

A town is building a rectangular playground with fencing all around it. The area of the playground is 99 square yards. One side of the playground needs 11 yards of fencing.

How much fencing is needed to enclose the entire playground? Explain or show your reasoning.

Solution

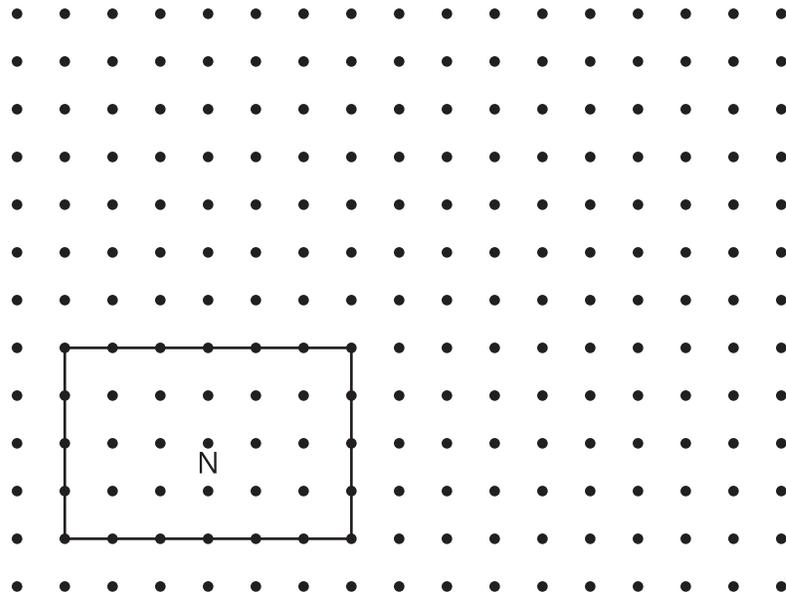
40 yards of fencing. Sample response: $9 \times 11 = 99$, so the second side of the playground is 9 yards. This means two sides are 11 yards and two sides are 9 yards. $11 + 11 + 9 + 9 = 40$

Problem 2

Goals Assessed

- Solve problems involving perimeter and area, in and out of context.

- a. Draw a rectangle that has the same perimeter as rectangle N but has a different area. Label it P. What is the area of P?

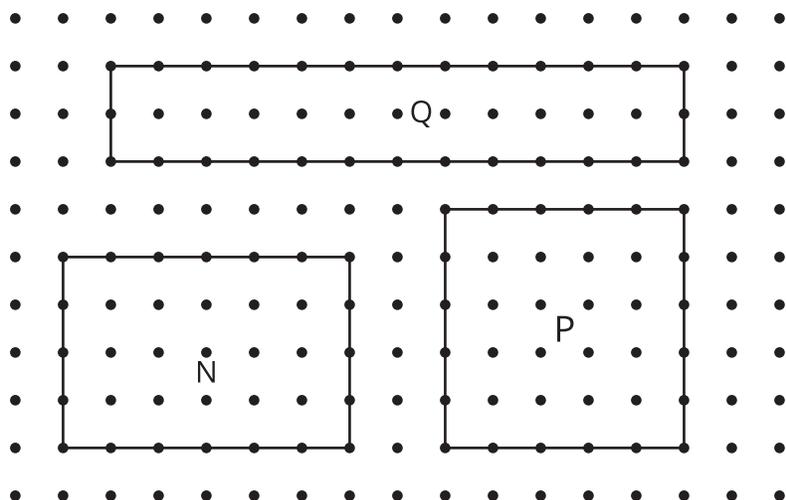


- b. Draw a rectangle that has the same area as rectangle N but has a different perimeter. Label it Q. What is the perimeter of Q?

Solution

Sample response:

- a. 25 square units
b. 28 units



Assessment: Section D Checkpoint

Problem 1

Goals Assessed

- Apply geometric understanding to solve problems.

A rectangular garden has an area of 21 square yards. What could be the side lengths of the garden? Explain or show your reasoning.

Solution

Sample response: 3 yards wide and 7 yards long since $3 \times 7 = 21$

Problem 2

Goals Assessed

- Apply geometric understanding to solve problems.

Lin drew a rectangle with a perimeter of 34 centimeters. The width of the rectangle is 6 cm.

- a. What is the length of the rectangle?
- b. What is the area of the rectangle?

Solution

Sample response:

- a. 11 cm
- b. 66 square centimeters

Assessment: End-of-Unit Assessment

Teacher Instructions

Give students access to rulers.

Problem 1

Standards Alignments

Addressing 3.G.A.1

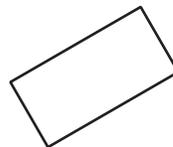
Narrative

Students identify common and distinguishing properties of two quadrilaterals belonging to different categories. For common characteristics they may identify the number of sides or some properties of the way the shapes are positioned. For distinguishing properties they may refer to angles or side lengths. A wide variety of responses should be expected and accepted.

How are the two shapes the same?

How are the two shapes different?

A



B



Solution

Sample responses: They are both quadrilaterals. They do not have any horizontal or vertical sides. Shape A has 4 right angles and two pairs of opposite sides that are the same length. Shape B has no right angles and all of the sides are the same length.

Problem 2

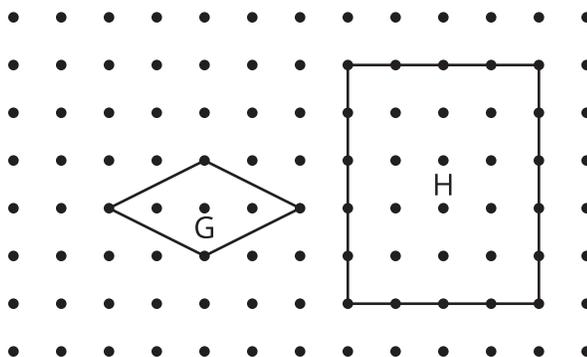
Standards Alignments

Addressing 3.G.A.1

Narrative

Students decide if a shape on a grid is a rhombus, rectangle, or square. Students who do not select A may have tried unsuccessfully to measure the sides. They can use the structure of the grid or use patty paper and fold it to see that the side lengths are the same. Students who select B or C have forgotten that rectangles must have 4 right angles. Students could select D and F if they do not look carefully at the side lengths but they are visually distinct.

Select **all** true statements.



- A. Figure G is a rhombus.
- B. Figure G is a rectangle.
- C. Figure G is a square.
- D. Figure H is a rhombus.
- E. Figure H is a rectangle.
- F. Figure H is a square.

Solution

["A", "E"]

Problem 3

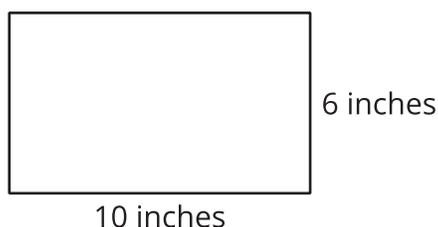
Standards Alignments

Addressing 3.G.A.1, 3.MD.D.8

Narrative

Students find the perimeter of a rectangle. Only two side lengths have been labeled, and the rectangle does not lie on a grid, so students will rely on their knowledge that opposite sides of a rectangle have the same length. The numbers are chosen so students should not struggle with the arithmetic part of this item.

Find the perimeter of the rectangle. Explain or show your reasoning.

**Solution**

32 inches. Sample response: The rectangle has 2 sides of 10 inches and 2 sides of 6 inches.
 $10 + 6 + 10 + 6 = 32$

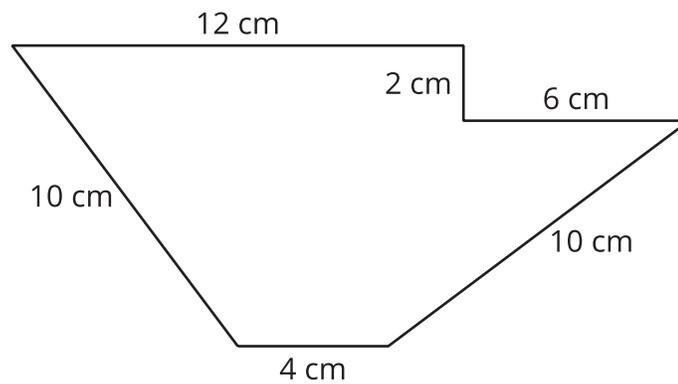
Problem 4**Standards Alignments**

Addressing 3.MD.D.8

Narrative

Students find the perimeter of a polygon with all side lengths provided. Other items assess student understanding of perimeter so the main focus of this item is on adding the side lengths efficiently and the chosen numbers are friendly for addition. The first response, 24, is visibly too small and is the sum of the horizontal and vertical side lengths. If a student selects this answer, they do not understand the meaning of perimeter. Students may select response B if they do not count the two incuse side lengths. Students may select C if they make an arithmetic error or if they do not include the small side of length 2 inches.

What is the perimeter of the shape?



- A. 24 cm
- B. 36 cm
- C. 42 cm
- D. 44 cm

Solution

D

Problem 5

Standards Alignments

Addressing 3.G.A.1, 3.MD.D.8

Narrative

Students use the properties of quadrilaterals to decide if they have enough information to determine the perimeter or area of a shape. Students who do not select A, C, or E have either made an arithmetic error or do not understand the definition of a square or rhombus. Students may select responses B or D if they are thinking of a particular rectangle, namely a square or a rhombus, but are not thinking of all of the other possible rectangles with one side length of 8 centimeters. Students who do not perform well on this item should be encouraged to draw different quadrilaterals, with or without the support of a grid.

A quadrilateral has one side length that is 8 centimeters. Select **all** statements that must be true about the quadrilateral.

- A. If the quadrilateral is a rhombus, then the perimeter is 32 centimeters.
- B. If the quadrilateral is a rectangle, then the perimeter is 32 centimeters.
- C. If the quadrilateral is a square, then the perimeter is 32 centimeters.
- D. If the quadrilateral is a rectangle, then the area is 64 square centimeters.
- E. If the quadrilateral is a square, then the area is 64 square centimeters.

Solution

["A", "C", "E"]

Problem 6

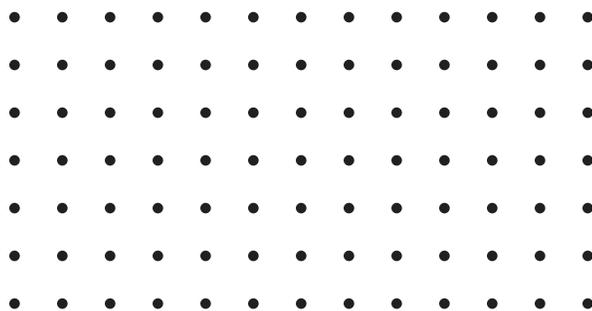
Standards Alignments

Addressing 3.MD.D.8

Narrative

Students find rectangles with the same area and different perimeter. They can find the rectangles by experimenting or by using the fact that they can write 12 as a product in three ways, 1×12 , 2×6 , and 3×4 . If students draw rectangles that do not have an area of 12 square units they may still accurately find the perimeter of those rectangles in the second question.

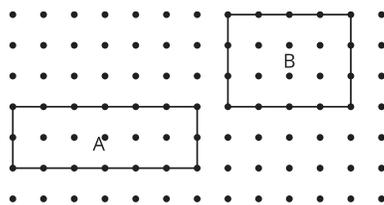
- a. Draw two rectangles with an area of 12 square units that have different perimeters.



- b. Find the perimeter of each rectangle.

Solution

- a. Sample responses:



- b. Rectangle A has a perimeter of 16 units. Rectangle B has a perimeter of 14 units.

Problem 7

Standards Alignments

Addressing 3.MD.C.7, 3.MD.D.8

Narrative

Students find rectangles with a specified perimeter and different areas in context. They calculate the area of the rectangles and then choose one of them. Students may offer many justifications for their choices. For example, they may choose the one with larger area and indicate that they want the dog to have more space. Or they may argue as in the given response that having a longer side gives the dog more space to run in a straight line.

Priya wants to make a rectangular playpen for her dog. She has 18 meters of fencing material.

- Andre suggests that Priya make a playpen that is 10 meters long and 8 meters wide. Explain why Priya does not have enough fencing to make this playpen.
- What are 2 possible pairs of side lengths Priya could use for the playpen that would give different areas? Explain or show your reasoning.
- Which playpen do you think Priya should make? Explain or show your reasoning.

Solution

Sample responses:

- The rectangular pen will have 2 sides of length 10 meters and 2 sides of length 8 meters so that's a lot more than 18 meters total.
- 5 meters by 4 meters or 6 meters by 3 meters. There are 2 sides of each length and that means the sides need to add up to 9 since $2 \times 9 = 18$. I chose 5 meters and 4 meters and 6 meters and 3 meters. The area is different because the 5 meter by 4 meter playpen has area 5×4 or 20 square meters and the 6 meter by 3 meter playpen has area 18 square meters.
- I like the 6 meter by 3 meter playpen. It has a little bit less area than the other one but the longer side gives the dog more room to run.

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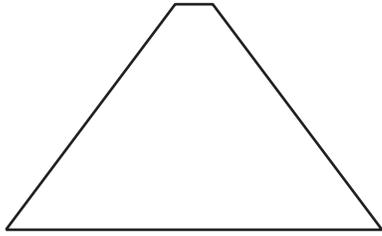


Lesson
Cool Downs

Lesson 1: What Attributes Do You See?

Cool Down: Tell Me About It

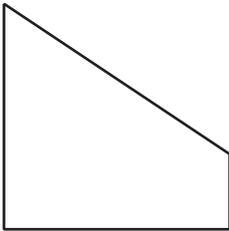
Select all the statements that are true about the shape.



- A. The shape has 3 sides.
- B. The shape has 4 sides.
- C. The shape has 5 sides.
- D. The shape has a right angle.
- E. None of the sides are the same length.
- F. Two of the sides are the same length.
- G. All of the sides are the same length.

Lesson 2: Attributes of Triangles and Quadrilaterals

Cool Down: Describe the Shape



Describe as many attributes of the shape as you can.

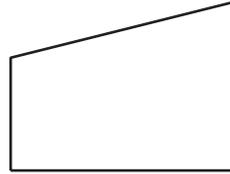
Lesson 3: Attributes that Define Shapes

Cool Down: Mystery Shape

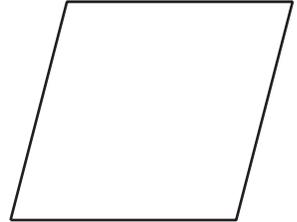
1. Which quadrilateral is being described?

- Hint 1: It has 4 sides.
- Hint 2: All of its sides are the same length.
- Hint 3: It has no right angles.

A



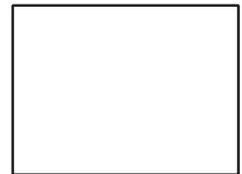
B



C



D



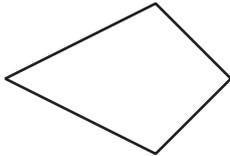
2. Which hints do you need to guess the quadrilateral? Explain your reasoning.

Lesson 4: Attributes of Rectangles, Rhombuses, and Squares

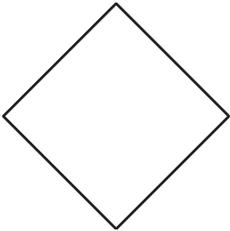
Cool Down: Find the Rhombuses

Select all of the quadrilaterals that are rhombuses. Explain your reasoning.

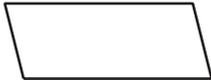
A



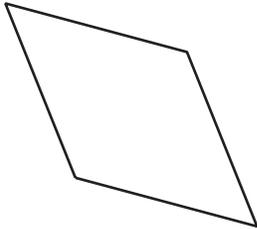
B



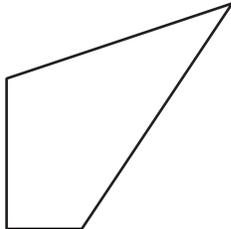
C



D



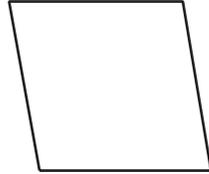
E



Lesson 5: Attributes of Other Quadrilaterals

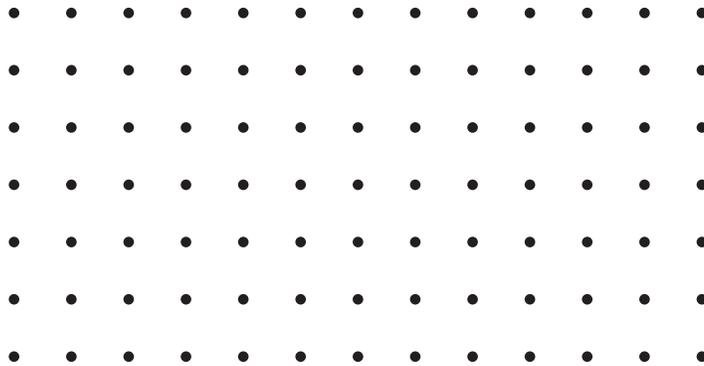
Cool Down: Describe It, Draw It

1. Select all the ways you could name this shape. Explain your reasoning.



- A. triangle
- B. quadrilateral
- C. pentagon
- D. square
- E. rhombus
- F. rectangle

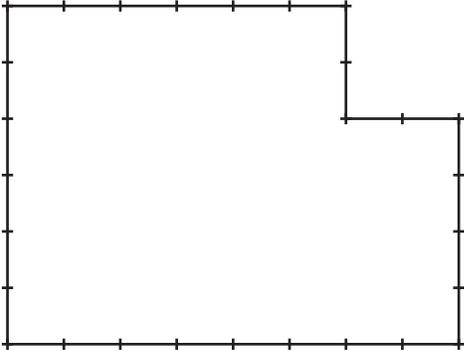
2. Draw a quadrilateral that is not a rectangle, a rhombus, or a square.



Lesson 6: Distance Around Shapes

Cool Down: What is the Perimeter?

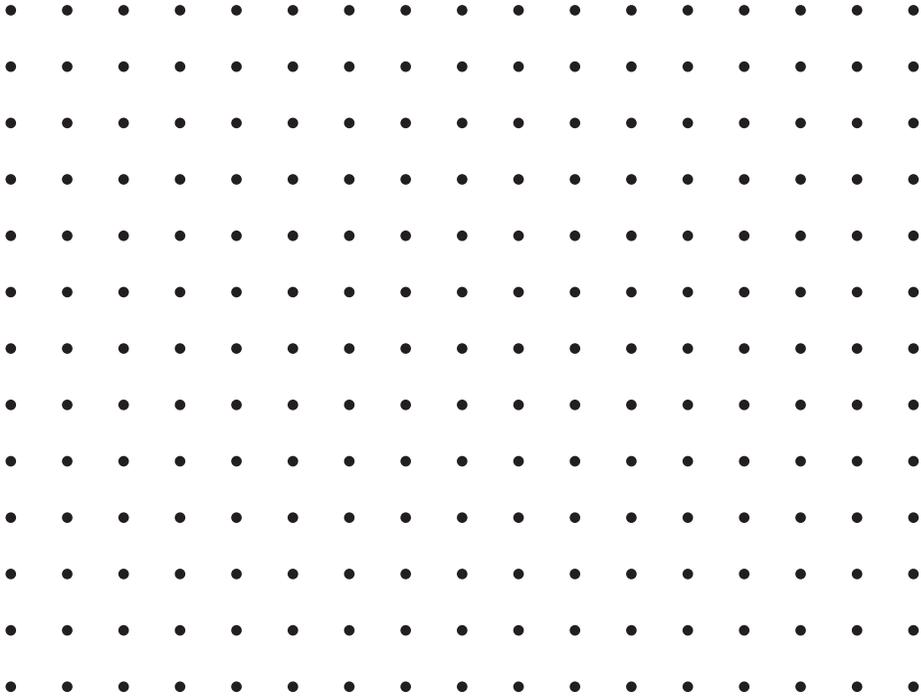
Find the perimeter of this shape. Explain or show your reasoning.



Lesson 7: Same Perimeter, Different Shapes

Cool Down: Create Your Own Shapes

Draw 2 different shapes that have a perimeter of 32 units.

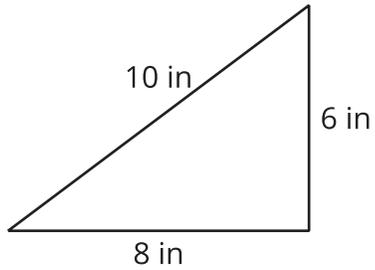


Lesson 8: Find the Perimeter

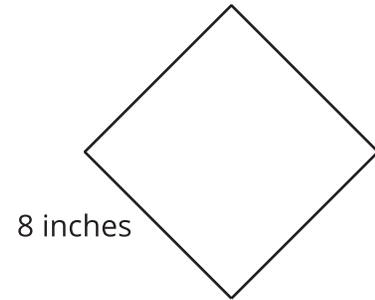
Cool Down: A Triangle and a Square

Find the perimeter of each shape. Explain or show your reasoning.

A



B



Lesson 9: Perimeter Problems

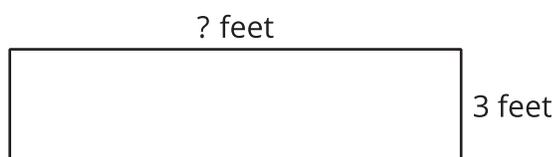
Cool Down: Sides of a Pool

A rectangular swimming pool has a perimeter of 94 feet. If it is 32 feet on one side, what are the lengths of the other three sides? Explain or show your reasoning.

Lesson 10: Problem Solving With Perimeter and Area

Cool Down: Lin's Garden Fence

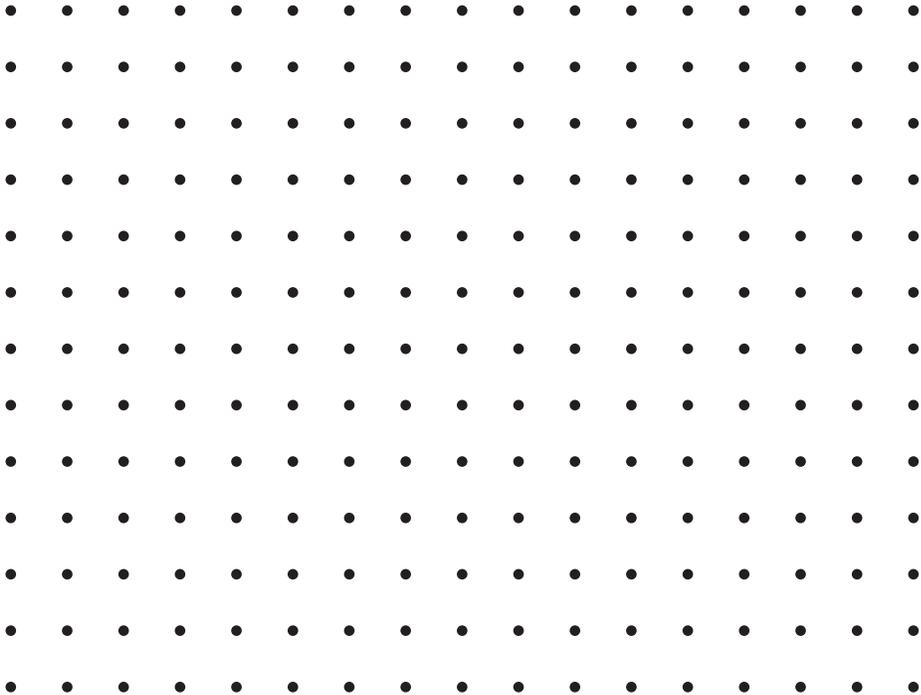
Lin is building a fence around her rectangular garden. A diagram is shown. The area of the garden is 36 square feet. How many feet of fencing material will she need to enclose the whole garden?



Lesson 11: Rectangles with the Same Perimeter

Cool Down: Perimeter of 18

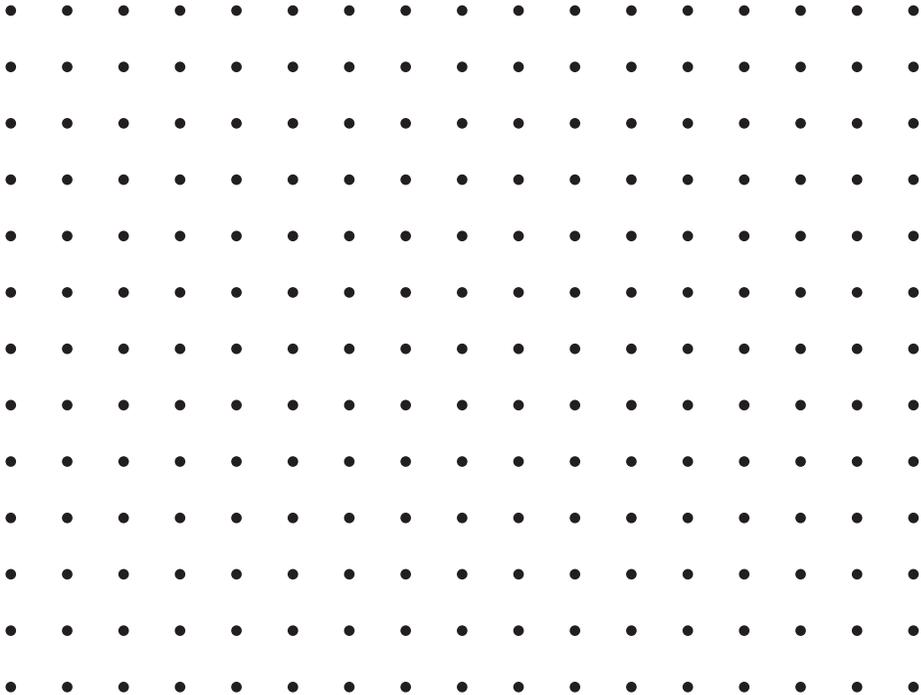
Draw two rectangles that each have a perimeter of 18 units, but different areas. Explain or show your reasoning.



Lesson 12: Rectangles with the Same Area

Cool Down: Area of 36

Draw two rectangles that each have an area of 36 square units but different perimeters. Explain or show your reasoning.



Lesson 13: Shapes and Play

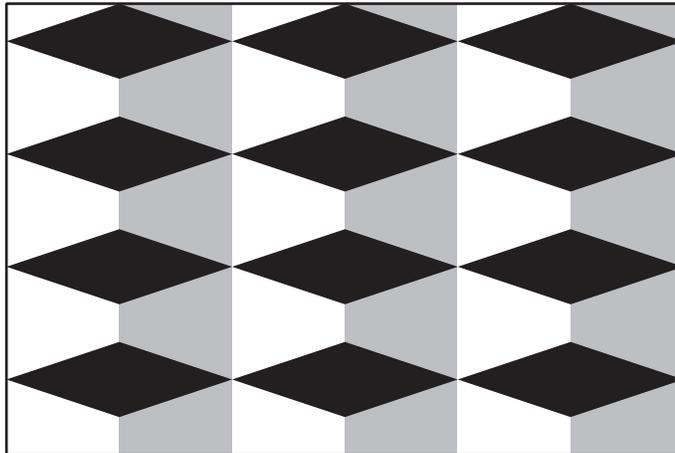
Cool Down: Possible Perimeters

A rectangular mural is being made for a park that will take up 64 square feet. Give 2 possible perimeters for the mural. Explain or show your reasoning.

Lesson 14: Wax Prints

Cool Down: Quadrilaterals in a Pattern

1. Describe the quadrilaterals that were used in this pattern.



2. If the image of the pattern is a rectangle with side lengths of 9 inches by 6 inches, what is the perimeter? Explain your reasoning.

Lesson 15: Design Your Own Robot

Cool Down: Reflect on Learning About Perimeter

Which lesson about shapes and perimeter was your favorite? Why?

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Instructional Masters

Instructional Masters for Two-dimensional Shapes and Perimeter

address	title	students per copy	written on?	requires cutting?	card stock recommended?	color paper recommended?
Activity Grade3.7.10.2	Info Gap: A Garden and a Playground	2	no	yes	no	no
Activity Grade3.7.14.2	Info Gap: The Bundle	2	no	yes	no	no
Activity Grade3.7.6.1	What Does It Take to Build the Shapes?	4	no	no	no	no
Activity Grade3.7.2.1	Triangle Cards Grade 3	2	no	yes	no	no
Center	Triangle Cards Grade 3	2	no	yes	no	no
Center	Triangle Cards Grade 3	2	no	yes	no	no
Activity Grade3.7.11.2	Square Dot Paper Standard	1	yes	no	no	no
Activity Grade3.7.12.2	Square Dot Paper Standard	1	yes	no	no	no
Activity Grade3.7.13.1	Square Dot Paper Standard	1	yes	no	no	no
Activity Grade3.7.14.1	Square Dot Paper Standard	1	yes	no	no	no
Activity Grade3.7.15.1	Square Dot Paper Standard	1	yes	no	no	no
Activity Grade3.7.1.1	Shape Cards Grade 3	2	no	yes	no	no
Center	Shape Cards Grade 3	2	no	yes	no	no
Center	Shape Cards Grade 3	2	no	yes	no	no

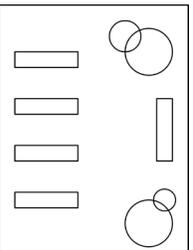
Center	Shape Cards Grade 3	2	no	yes	no	no	no
Activity Grade3.7.2.2	Quadrilateral Cards Grade 3	2	no	yes	no	no	no
Center	Quadrilateral Cards Grade 3	2	no	yes	no	no	no
Center	Quadrilateral Cards Grade 3	2	no	yes	no	no	no
Center	Quadrilateral Cards Grade 3	2	no	yes	no	no	no
Center	Centimeter Dot Paper - Standard	1	yes	no	no	no	no
Center	Shape Cards Grade 2	2	no	yes	no	no	no
Center	Shape Cards Grade 2	2	no	yes	no	no	no
Center	Shape Cards Grade 2	2	no	yes	no	no	no
Center	Picture Books Stage 3 Recording Sheet	1	yes	no	no	no	no
Center	Centimeter Grid Paper - Standard	2	yes	no	no	no	no
Center	Can You Draw It Stage 3 Directions	2	no	no	no	no	no
Center	Can You Draw It Stage 4 Recording Sheet	1	yes	no	no	no	no
Center	Compare Stage 4 Division Cards	2	no	yes	no	no	no
Center	Compare Stage 3-8 Directions	2	yes	no	no	no	no
Center	How Close? Stage 5 Recording Sheet	1	yes	no	no	no	no

Info Gap: A Garden and a Playground

A Garden and a Playground

Problem Card 1

A gardener has a rectangular garden. She found its area in square meters.



What is the perimeter of the garden?

A Garden and a Playground

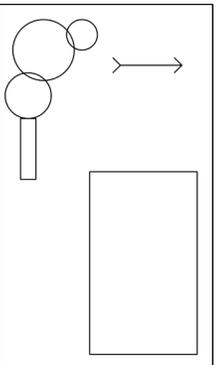
Data Card 1

- The area of the garden is 48 square meters.
- The longer side is 2 meters longer than the shorter side.
- One side of the garden is 8 meters.

A Garden and a Playground

Problem Card 2

A school has a rectangular playground. A teacher found its perimeter and area.



What is the area of the playground?

A Garden and a Playground

Data Card 2

- The perimeter of the playground is 38 meters.
- The longer side is an even number of meters.
- The shorter side of the playground is 7 meters.

The Bundle

Problem Card 1

A bundle of wax print cloth is purchased. Some is used to make a head wrap and some is used to make a lapa.

The rest goes to the tailor to make a shirt.

How much wax print cloth goes to the tailor to make a shirt?

The Bundle

Data Card 1

- The cloth in the bundle is a rectangle.
- The cloth in the bundle is 18 feet by 4 feet.
- The head wrap is made from a rectangle of cloth that is 2 feet by 6 feet.
- The lapa is made from a rectangle of cloth that is 7 feet by 4 feet.

The Bundle

Problem Card 2

Ribbon is sewn around the perimeter of the lapa and the bottom of the shirt.

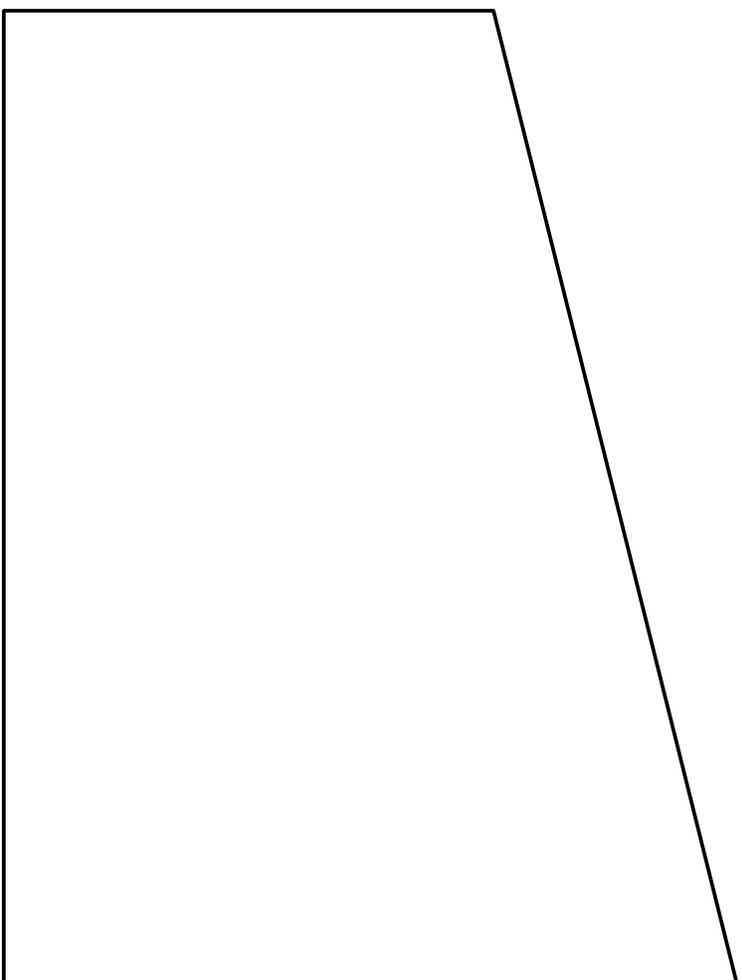
How much ribbon is needed altogether to decorate the lapa and the shirt?

The Bundle

Data Card 2

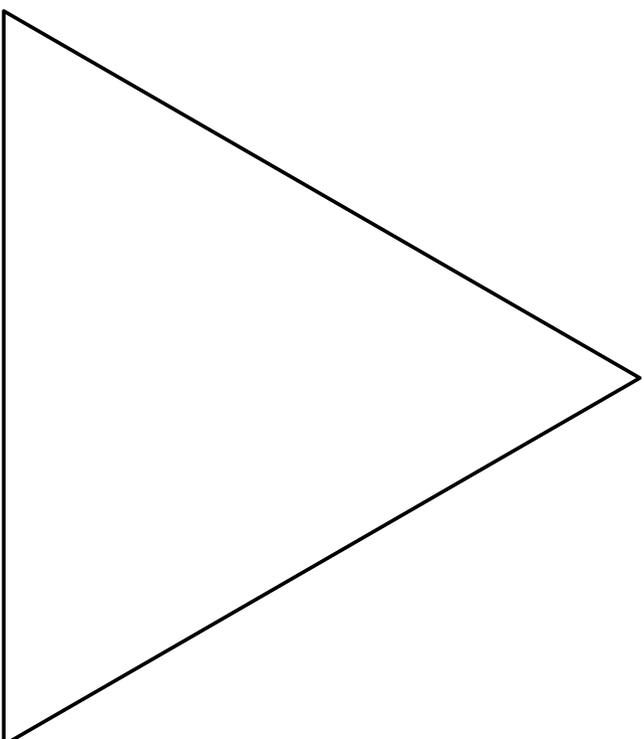
- The piece of cloth used for the lapa is a rectangle.
- The piece of cloth used for the lapa is 7 feet by 4 feet.
- The bottom of the shirt is 3 feet long.

What Does It Take to Build the Shapes?



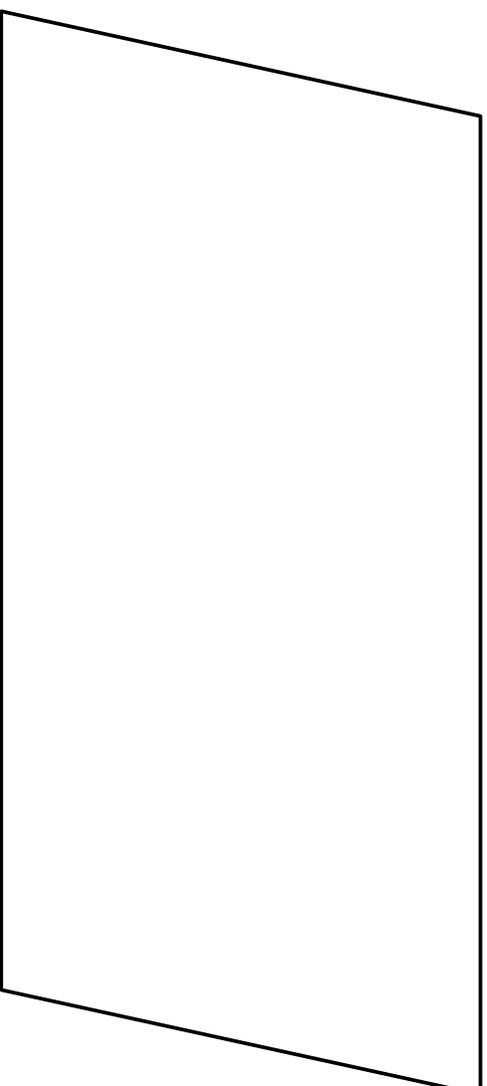
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What Does It Take to Build the Shapes?



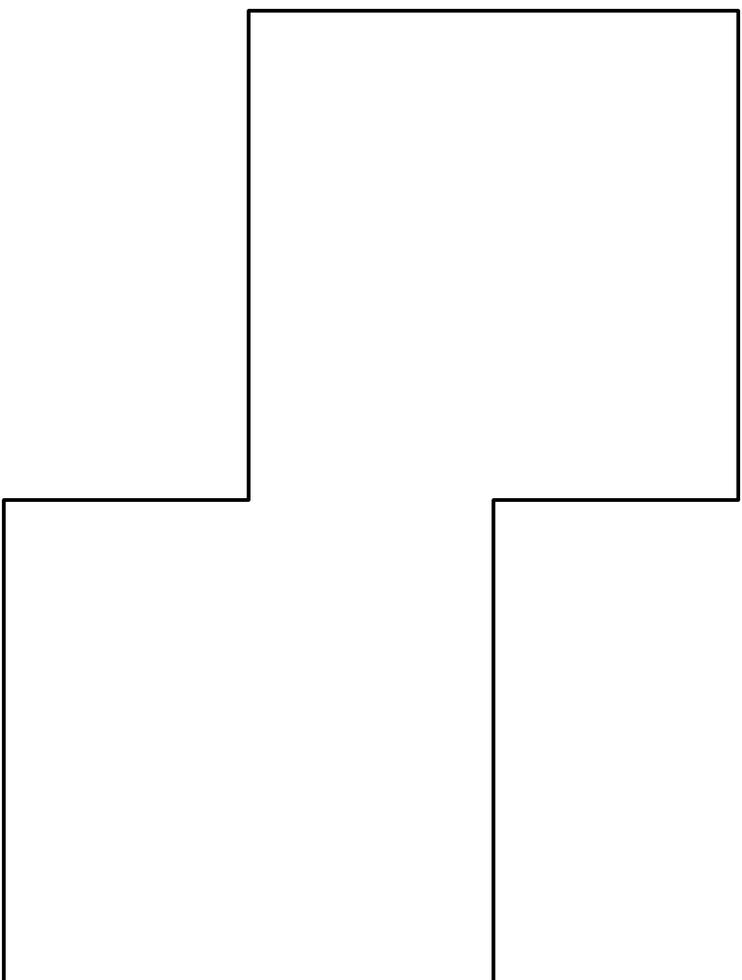
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What Does It Take to Build the Shapes?



C

What Does It Take to Build the Shapes?



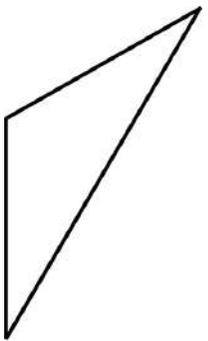
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Triangle Cards Grade 3

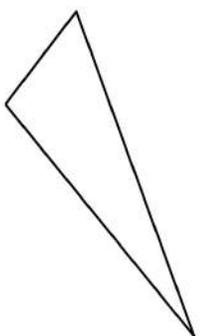
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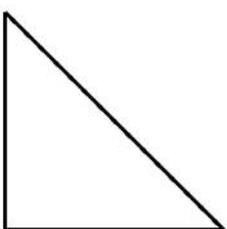
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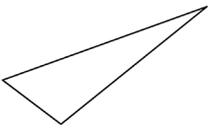
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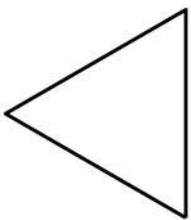
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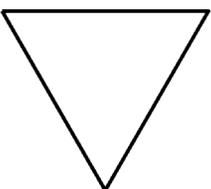
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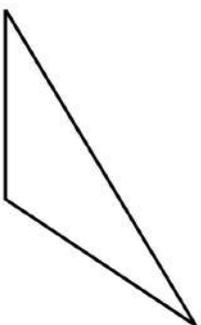
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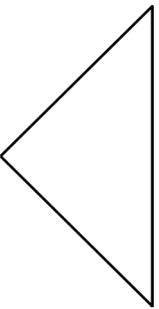
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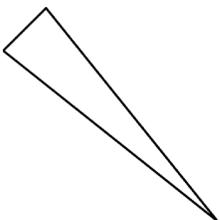
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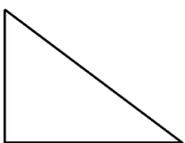
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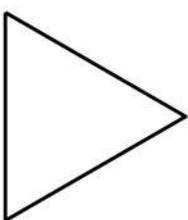
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Triangle Cards Grade 3



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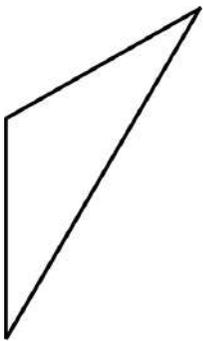


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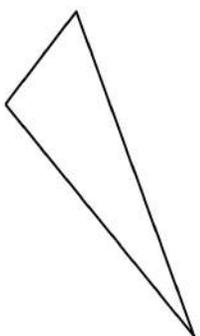
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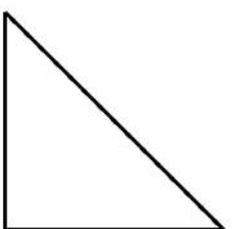
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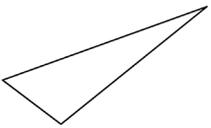
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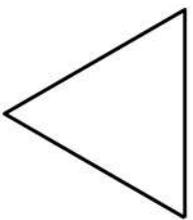
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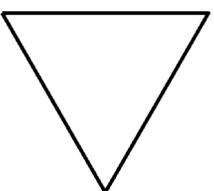
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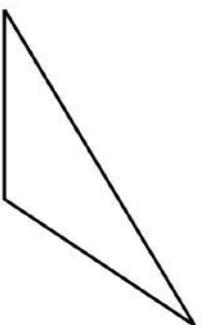
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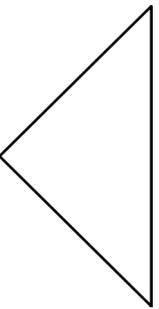
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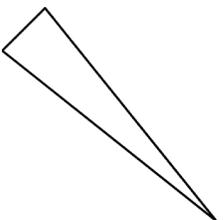
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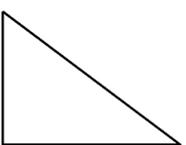
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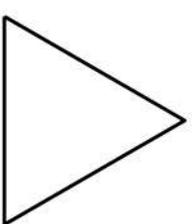
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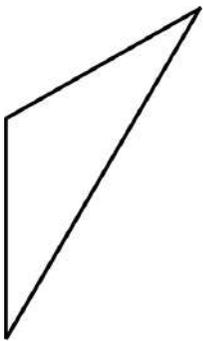


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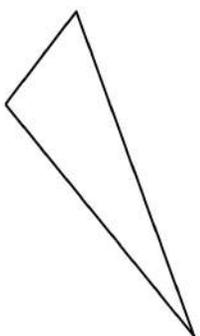
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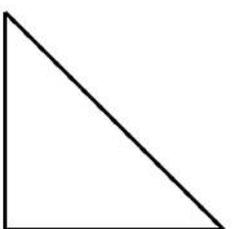
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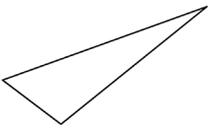
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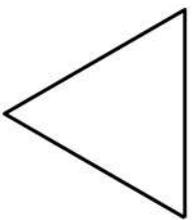
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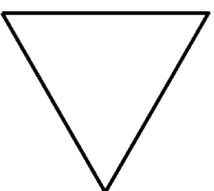
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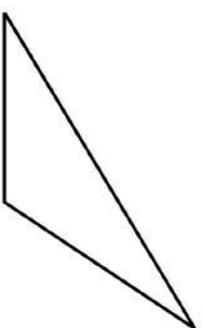
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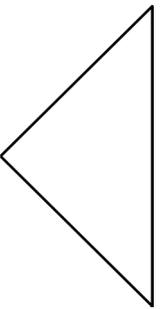
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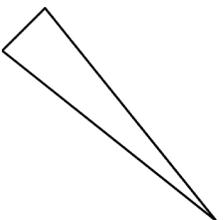
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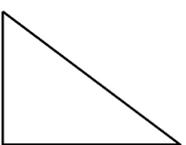
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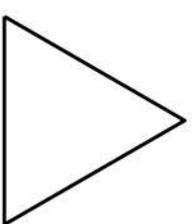
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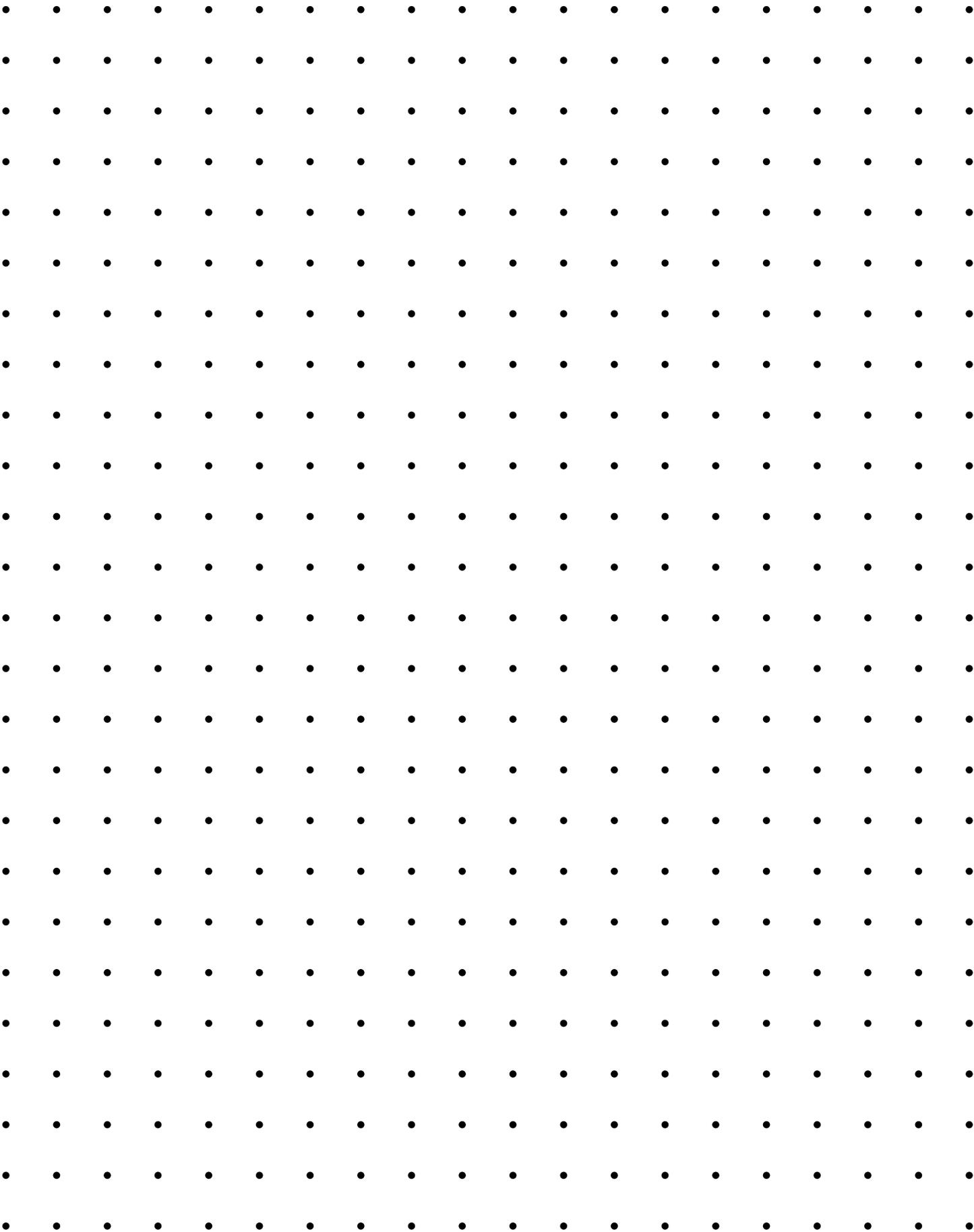
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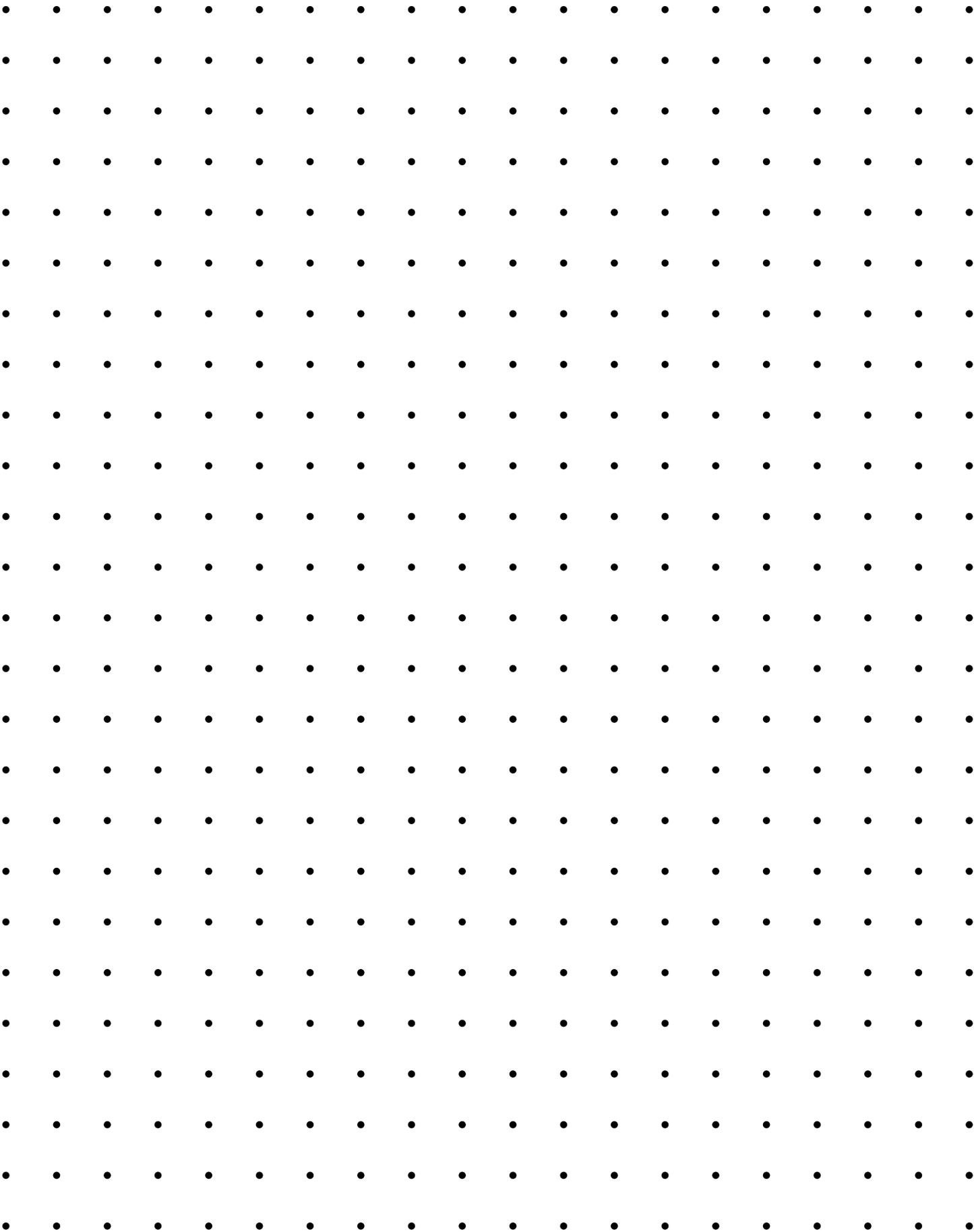
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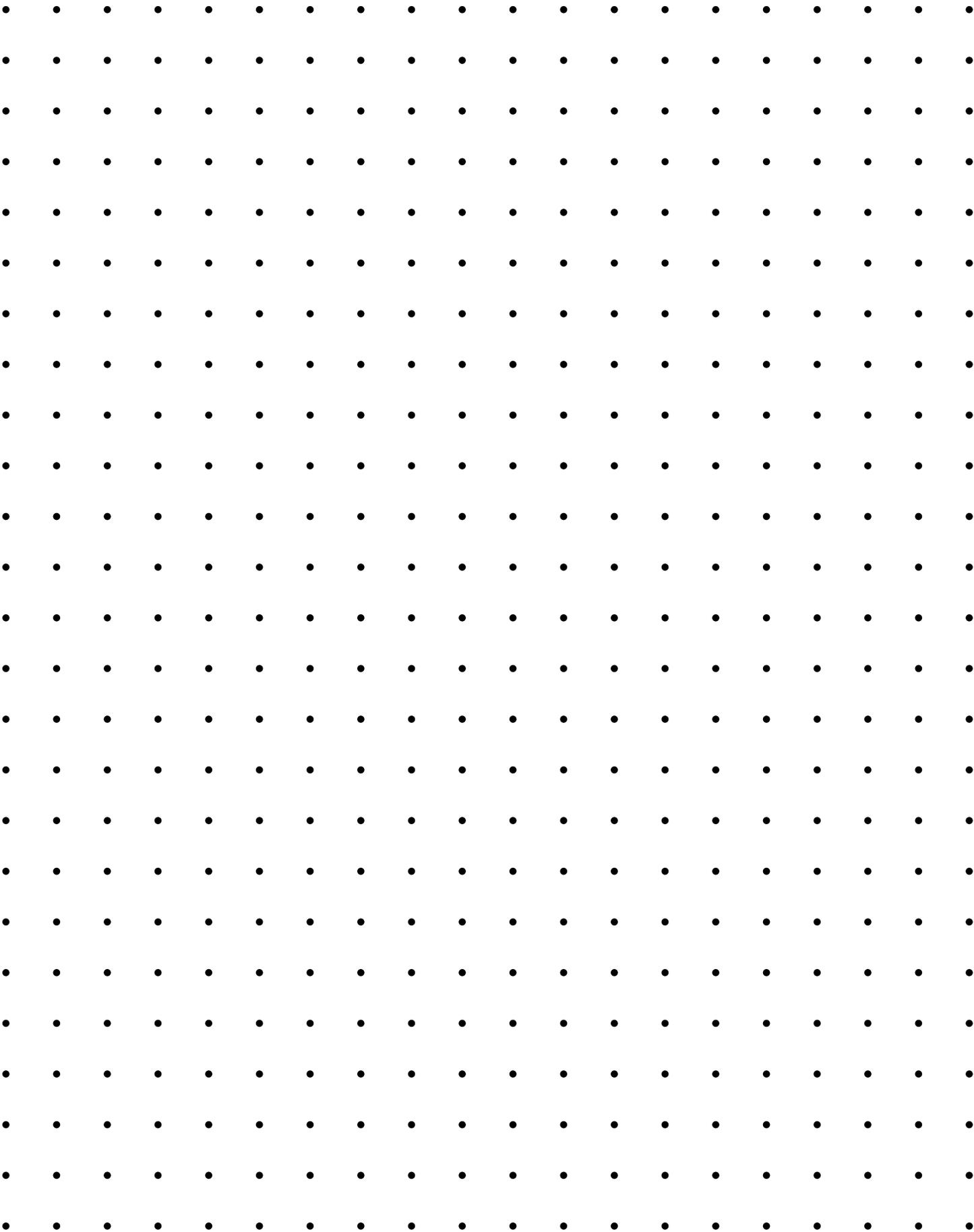
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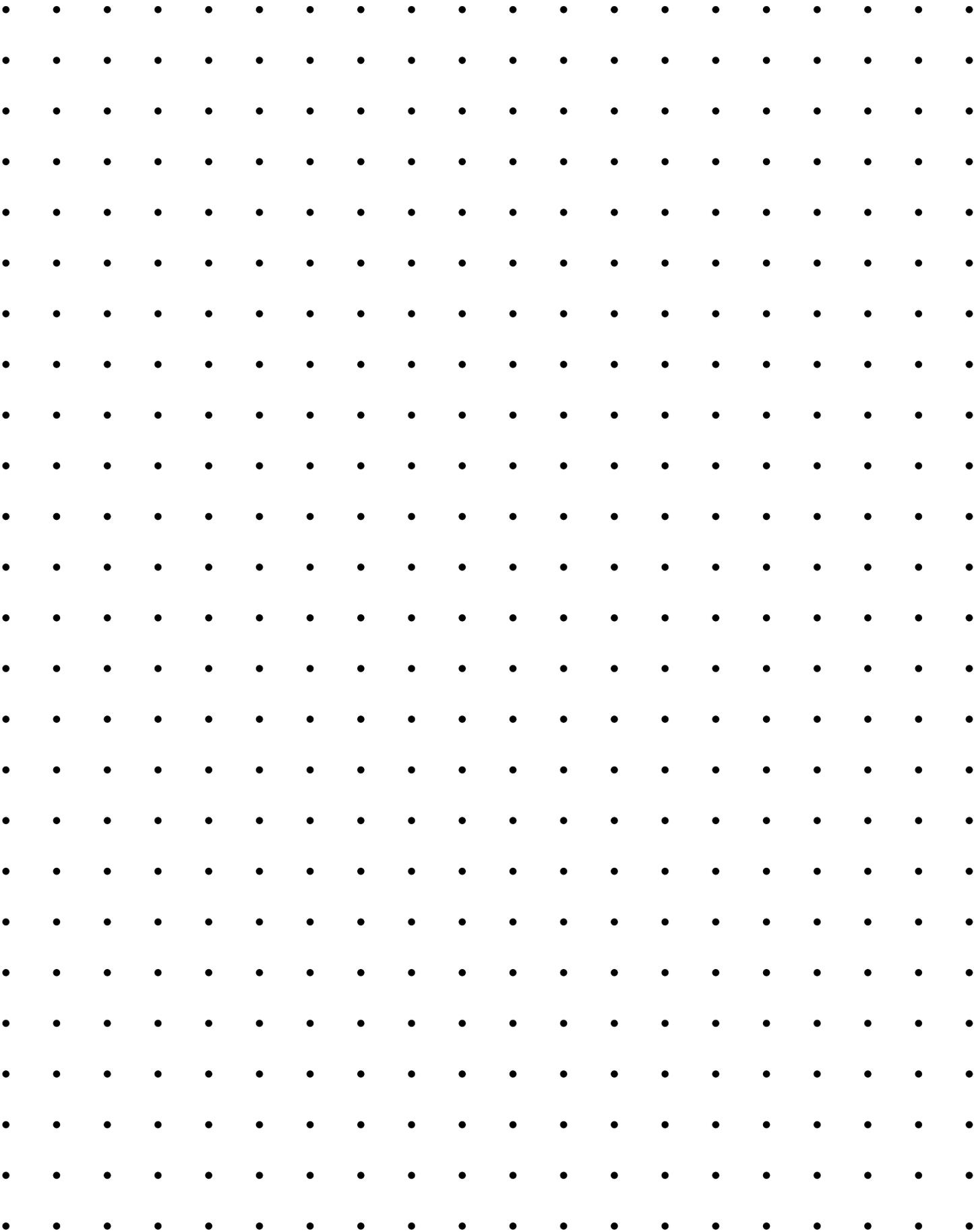
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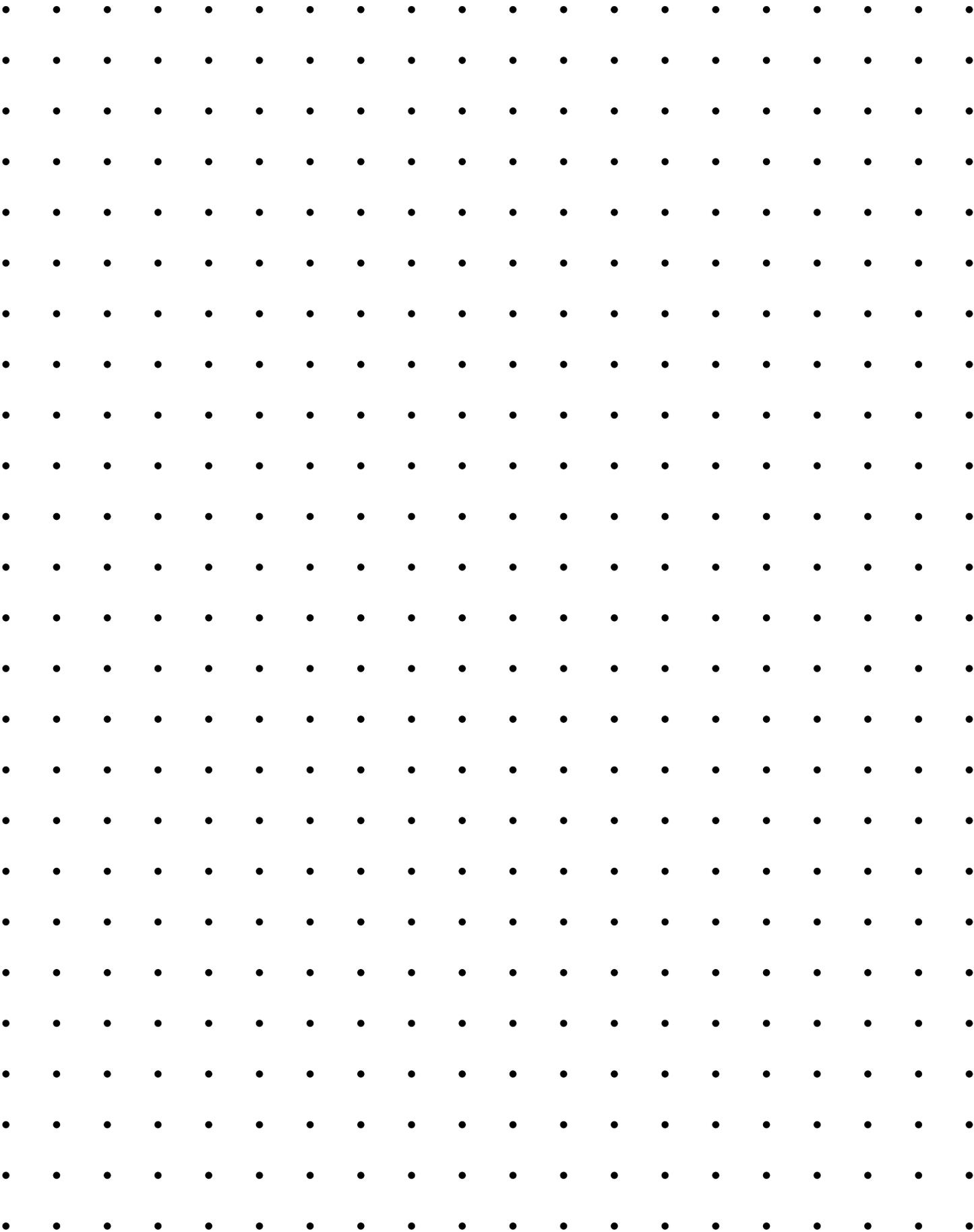
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Square Dot Paper Standard

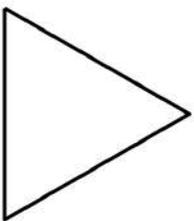


Square Dot Paper Standard



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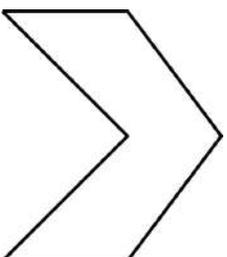
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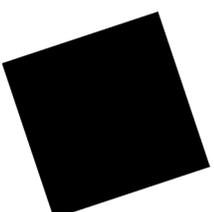
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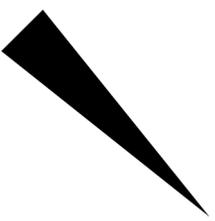
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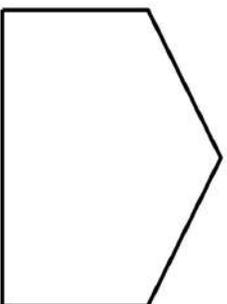
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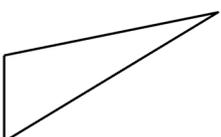
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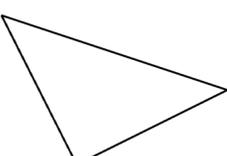
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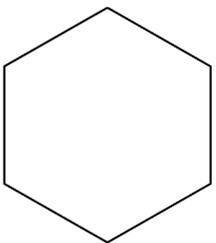
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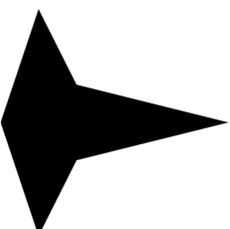
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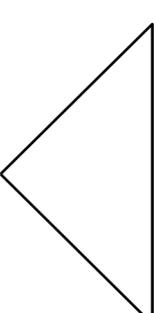
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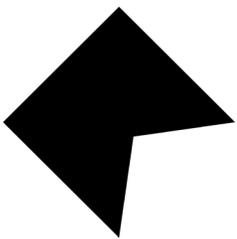


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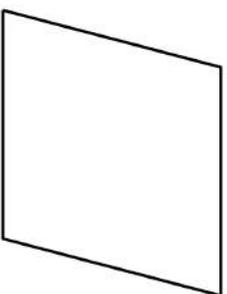


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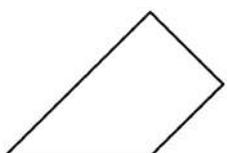
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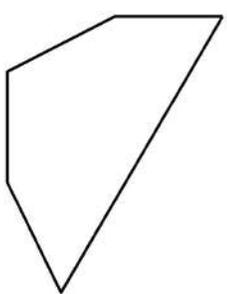
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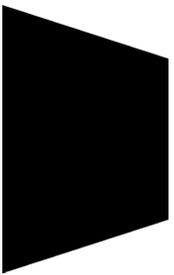
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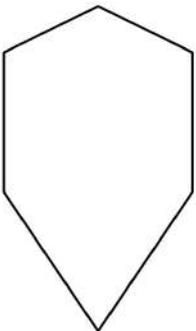
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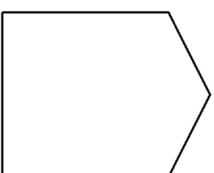
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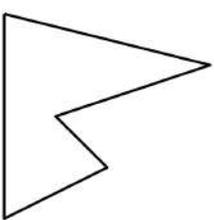
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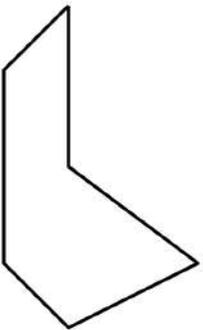
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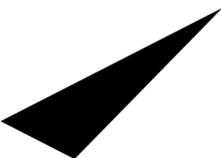
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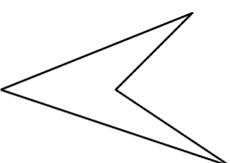
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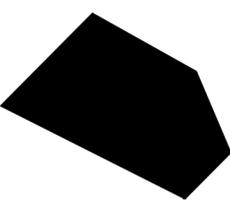
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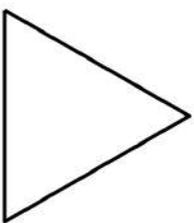


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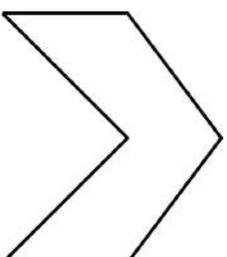
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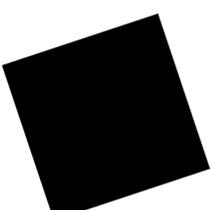
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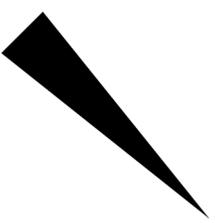
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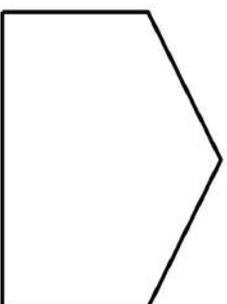
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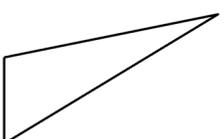
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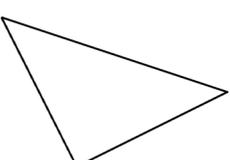
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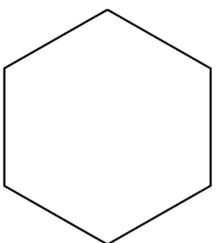
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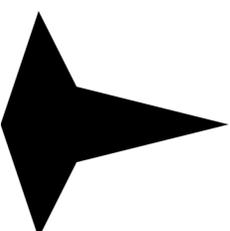
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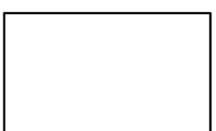
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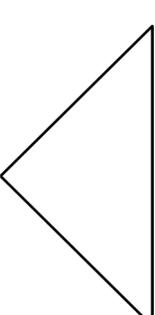
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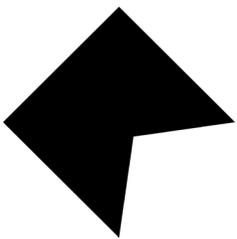


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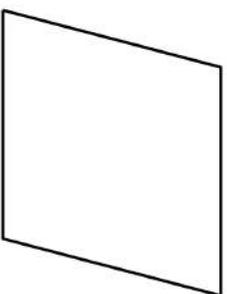


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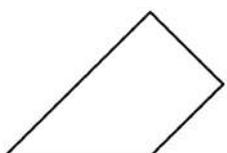
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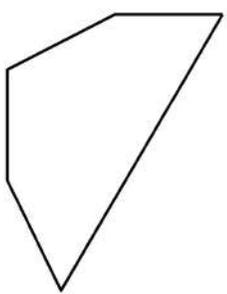
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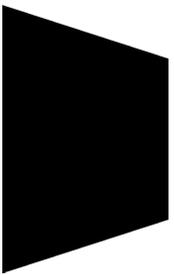
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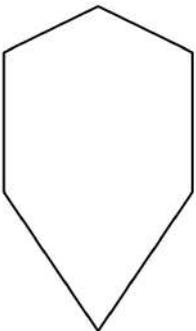
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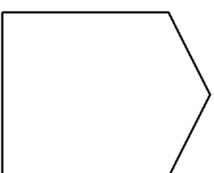
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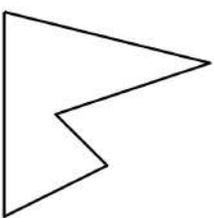
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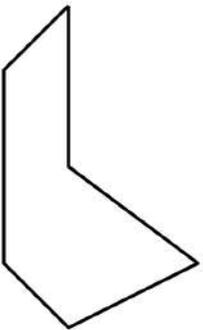
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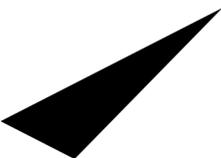
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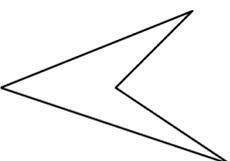
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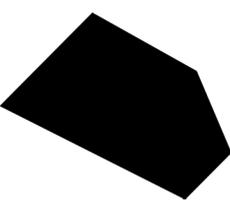
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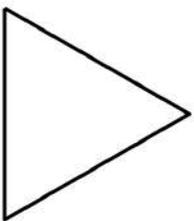


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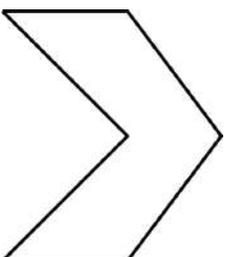
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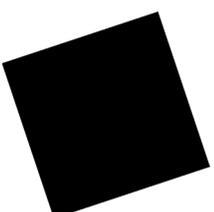
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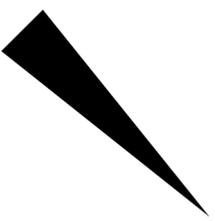
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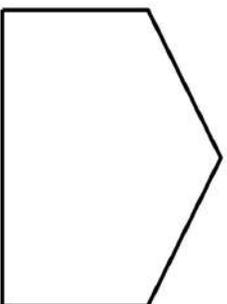
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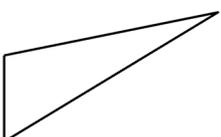
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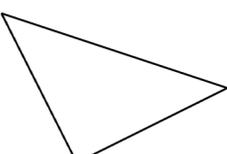
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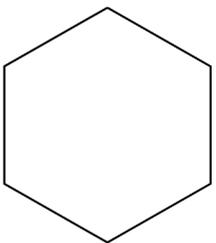
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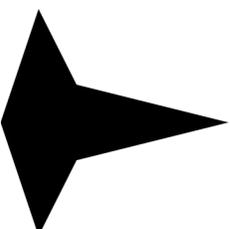
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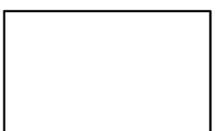
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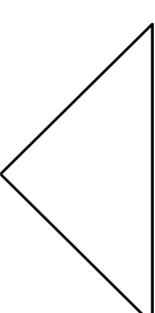
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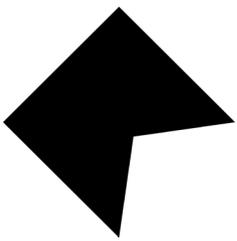


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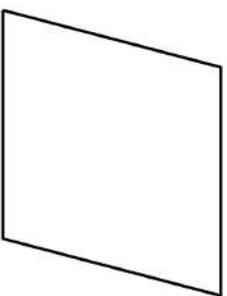


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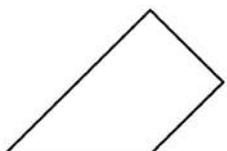
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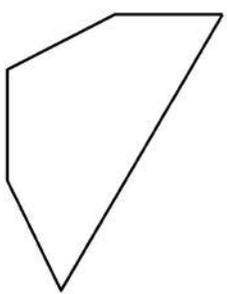
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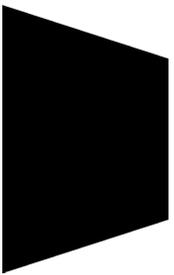
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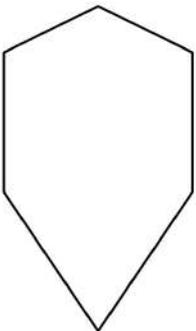
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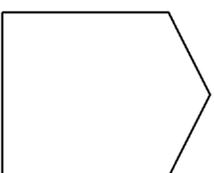
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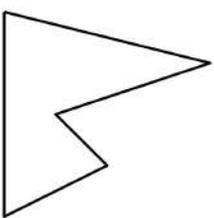
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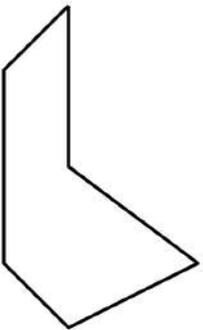
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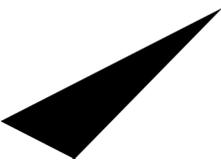
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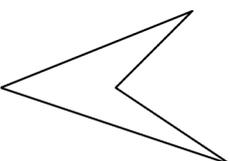
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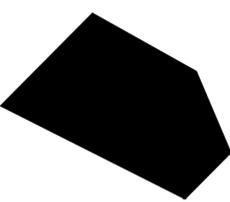
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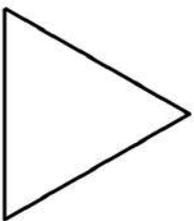


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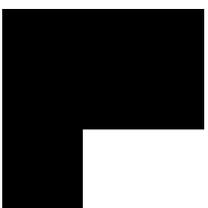


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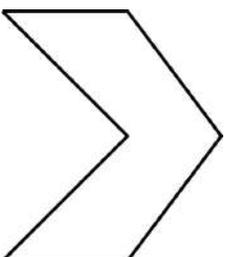
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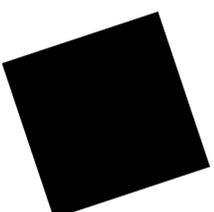
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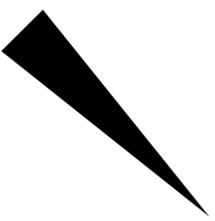
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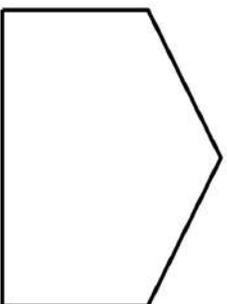
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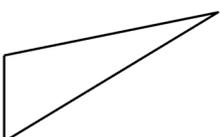
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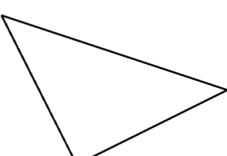
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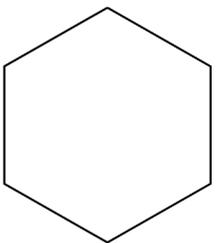
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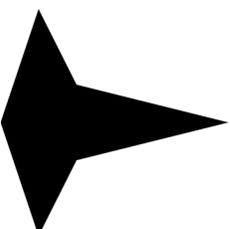
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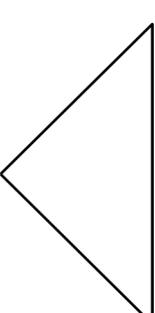
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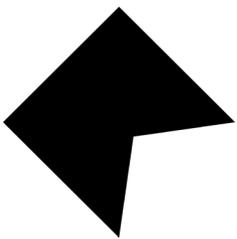


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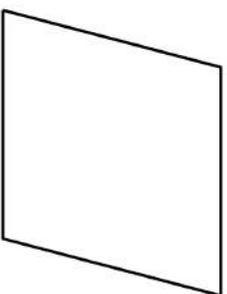


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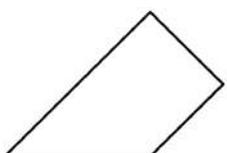
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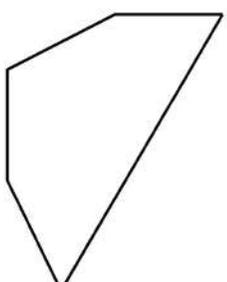
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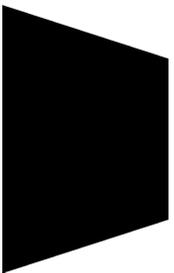
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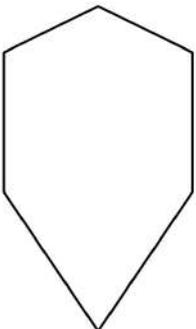
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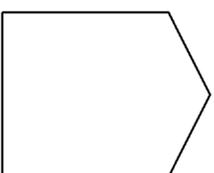
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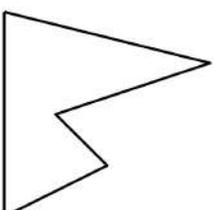
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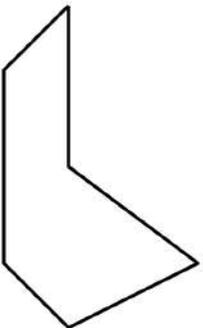
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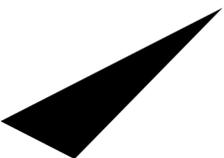
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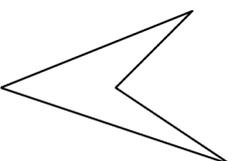
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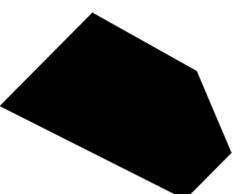
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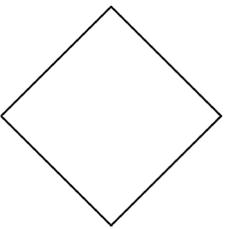


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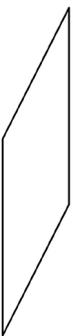


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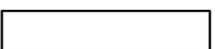
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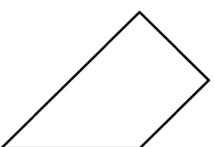
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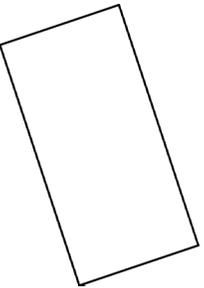
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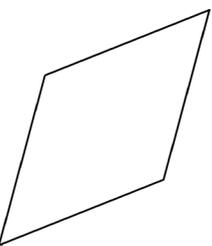
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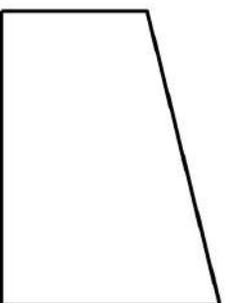
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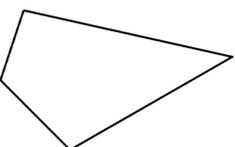
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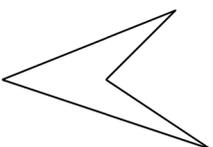
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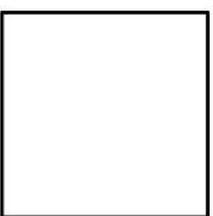
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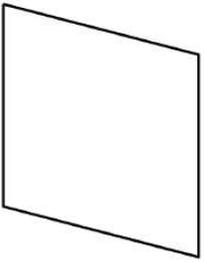


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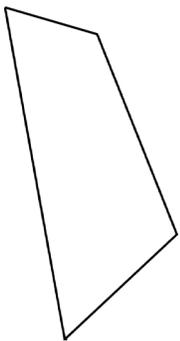


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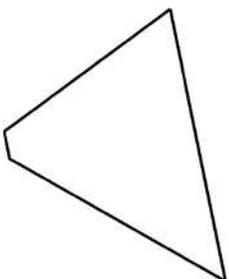
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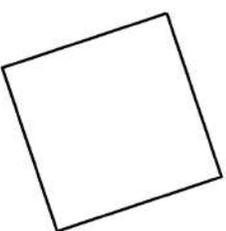
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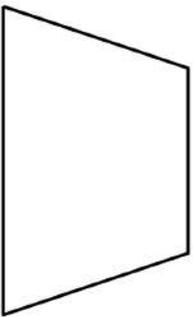
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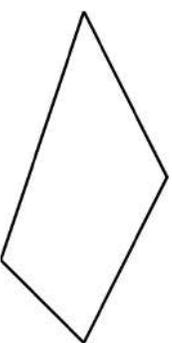
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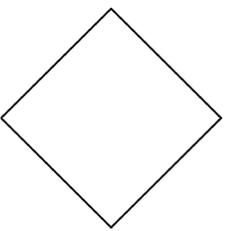


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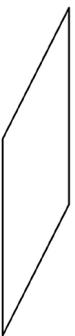


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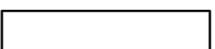
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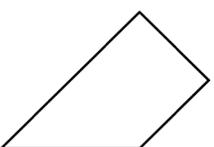
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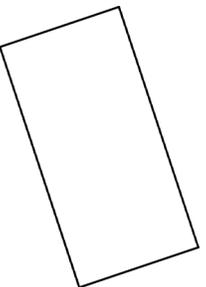
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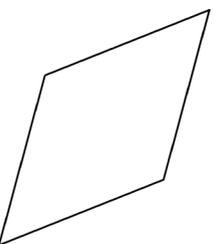
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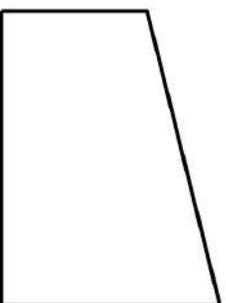
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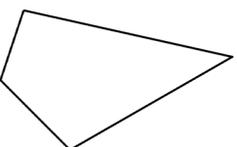
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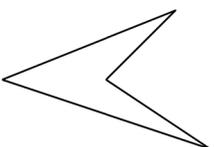
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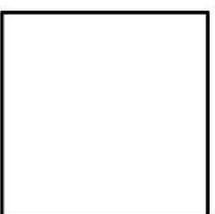
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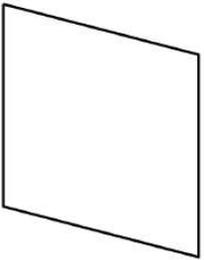


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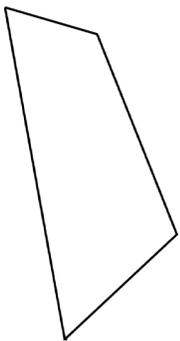


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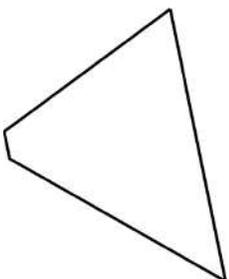
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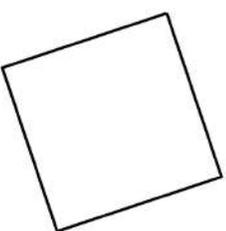
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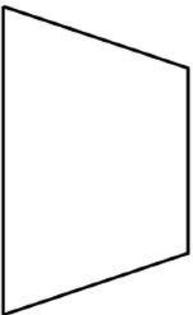
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BB
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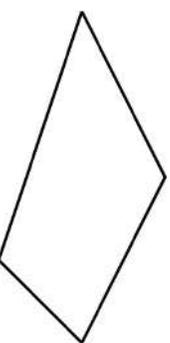
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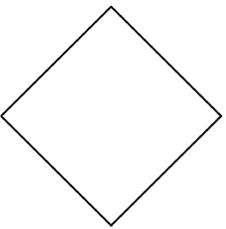


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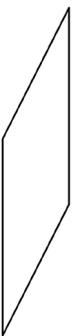


Quadrilateral Cards Grade 3

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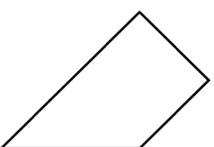
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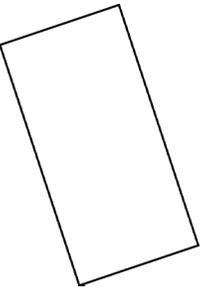
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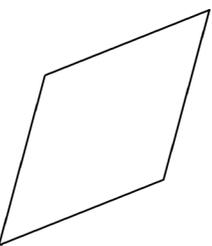
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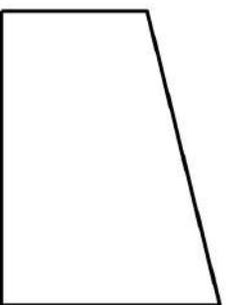
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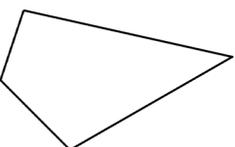
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Quadrilateral Cards Grade 3



T
Quadrilateral Cards Grade 3



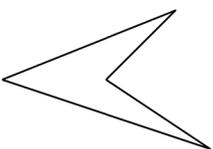
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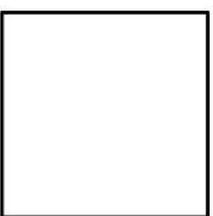
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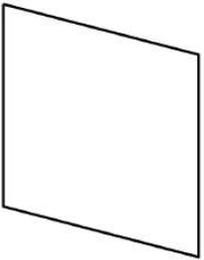


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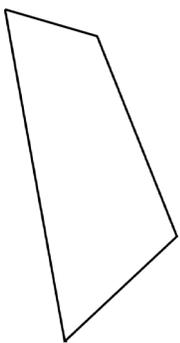


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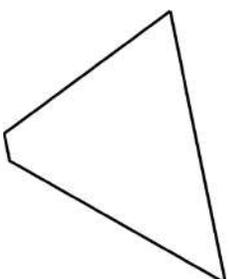
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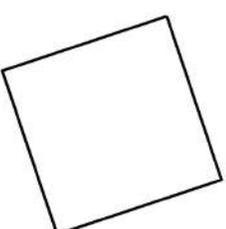
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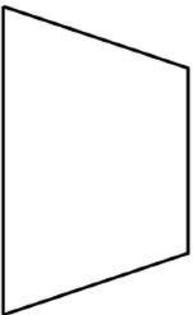
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BB
Quadrilateral Cards Grade 3



CC
Quadrilateral Cards Grade 3



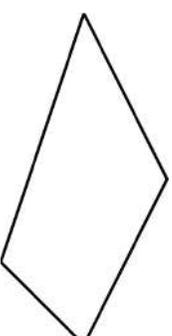
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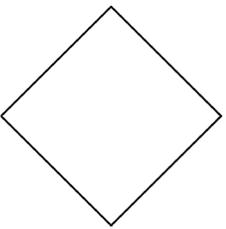


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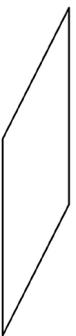


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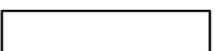
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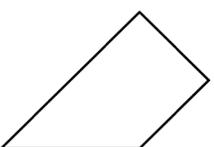
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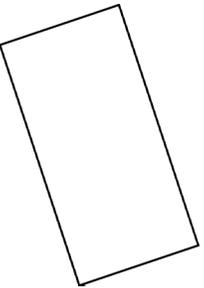
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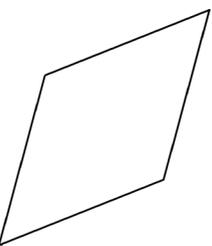
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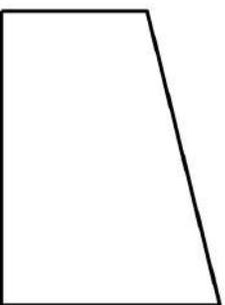
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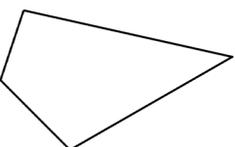
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Quadrilateral Cards Grade 3



S
Quadrilateral Cards Grade 3



T
Quadrilateral Cards Grade 3



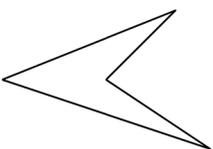
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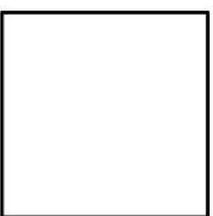
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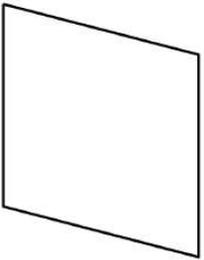


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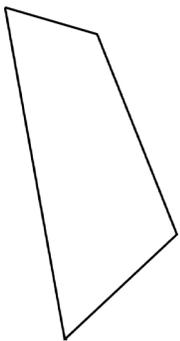


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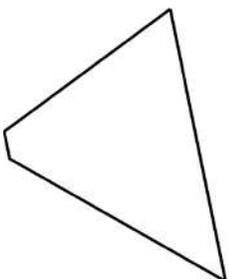
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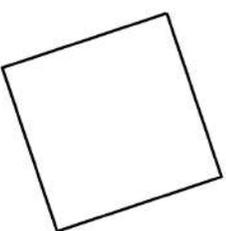
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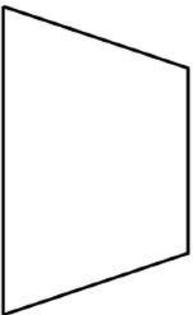
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Quadrilateral Cards Grade 3



BB
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CC
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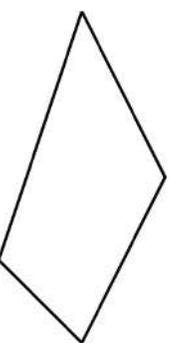
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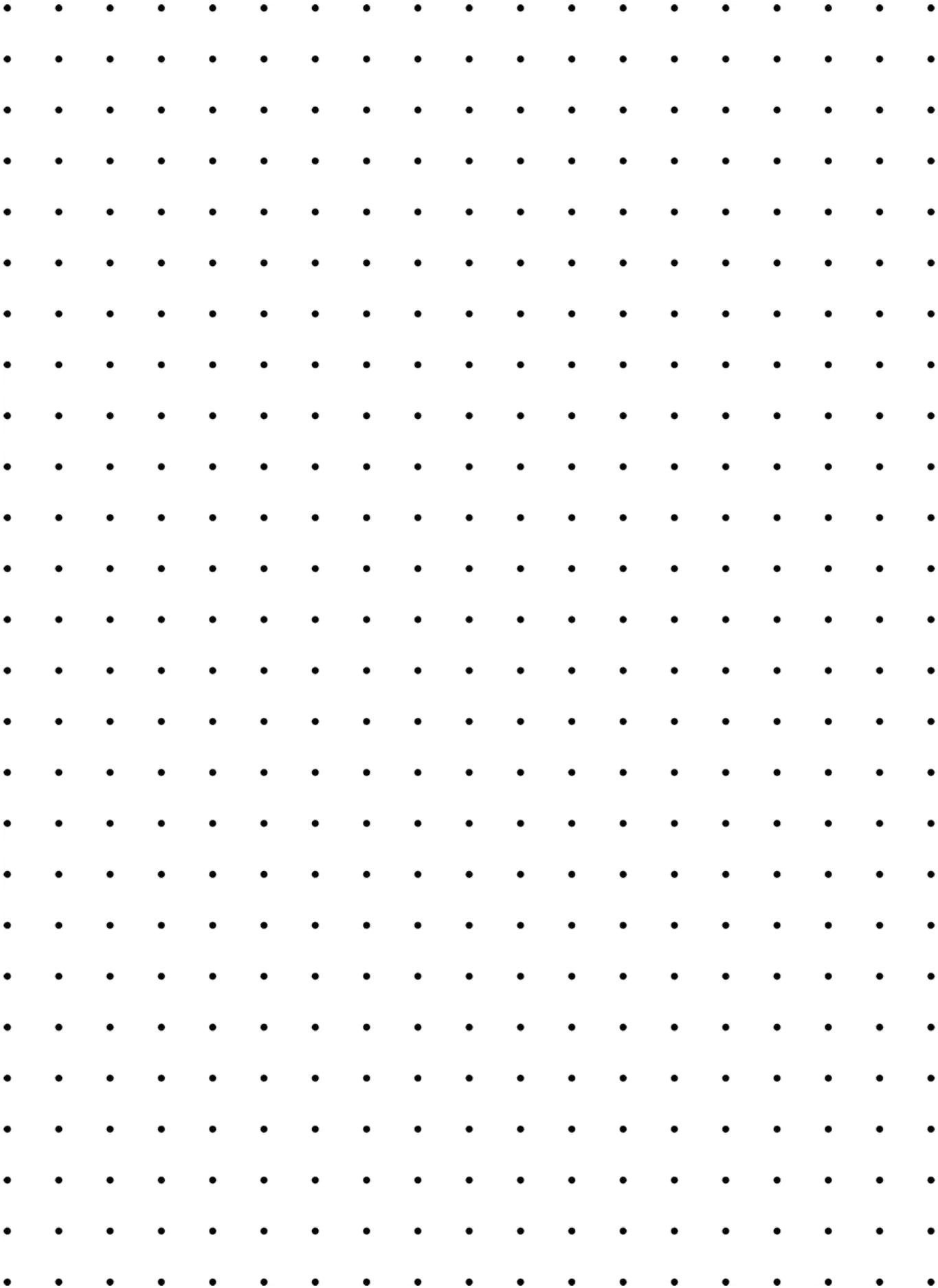
EE
Quadrilateral Cards Grade 3



FF
Quadrilateral Cards Grade 3



Centimeter Dot Paper - Standard



Shape Cards Grade 2

triangles

Shape Cards Grade 2

quadrilaterals

Shape Cards Grade 2

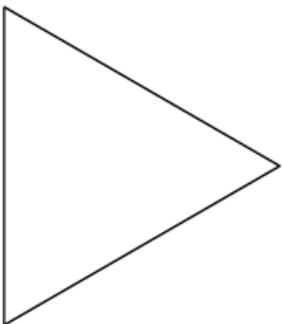
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Shape Cards Grade 2

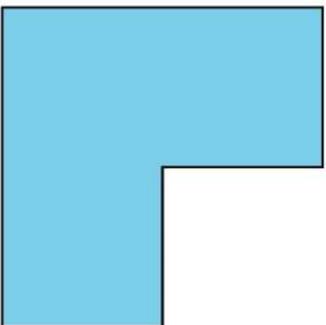
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Shape Cards Grade 2

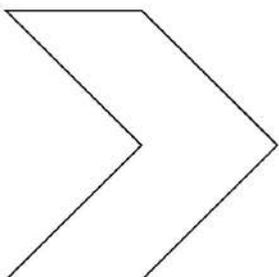
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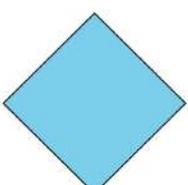
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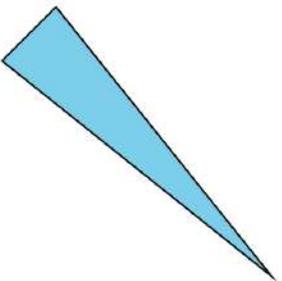
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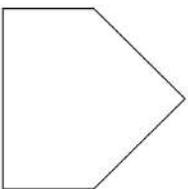
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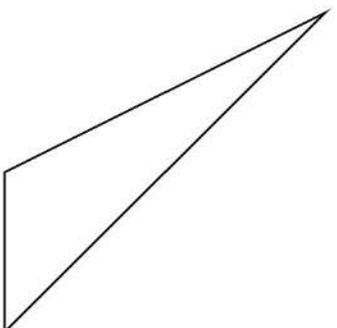
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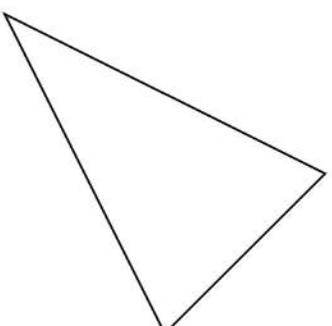
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Shape Cards Grade 2
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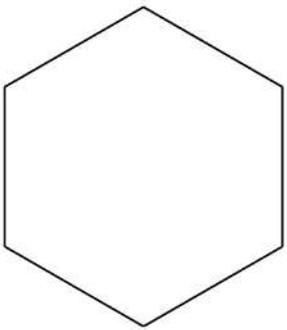


Shape Cards Grade 2
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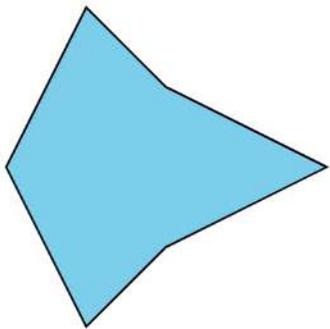


Shape Cards Grade 2

I
Shape Cards Grade 2



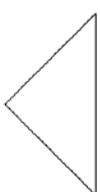
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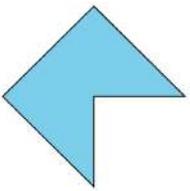
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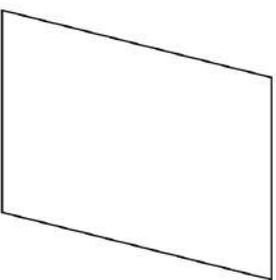
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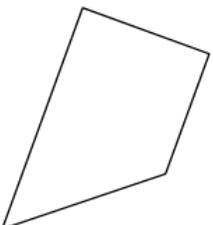
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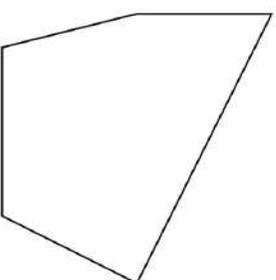
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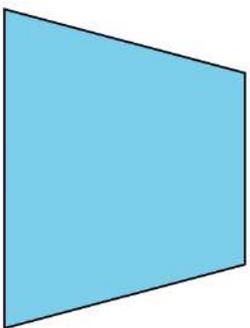


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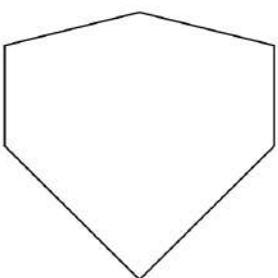


Shape Cards Grade 2

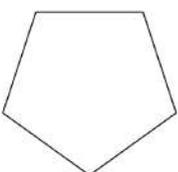
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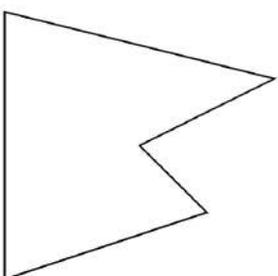
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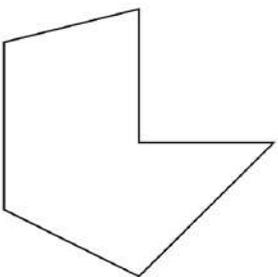
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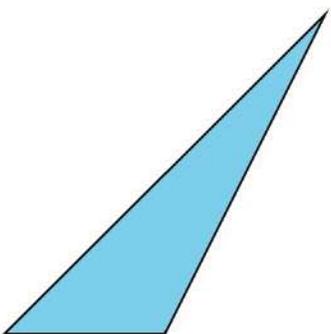
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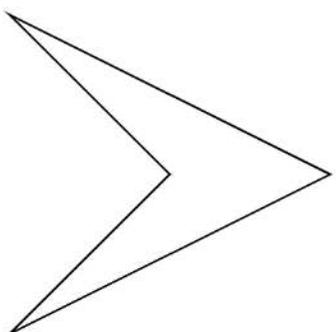
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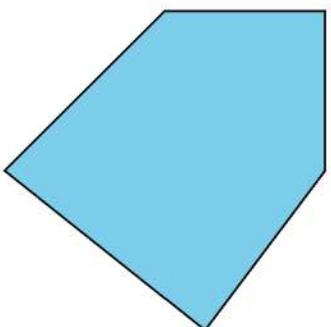
Shape Cards Grade 2
V



Shape Cards Grade 2
W



Shape Cards Grade 2
X



Shape Cards Grade 2

triangles

Shape Cards Grade 2

quadrilaterals

Shape Cards Grade 2

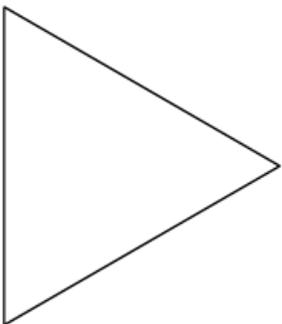
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Shape Cards Grade 2

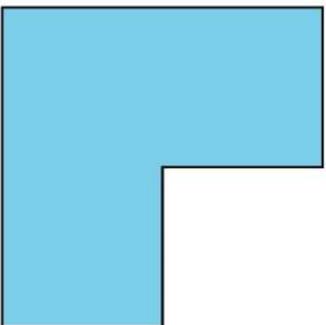
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Shape Cards Grade 2

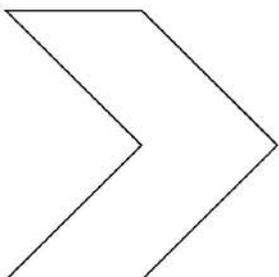
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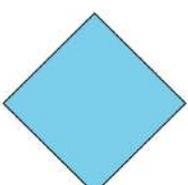
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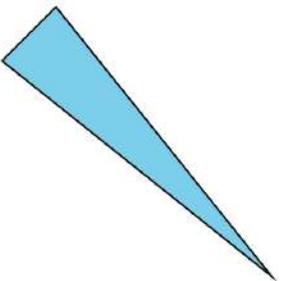
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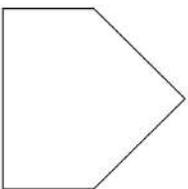
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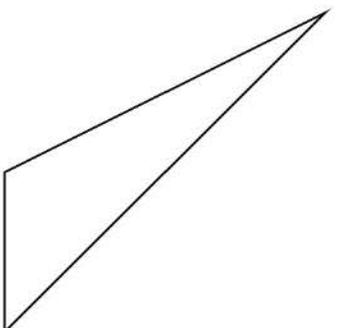
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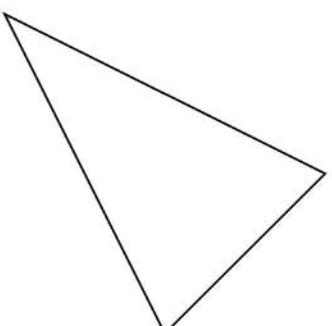
Shape Cards Grade 2
F



Shape Cards Grade 2
G

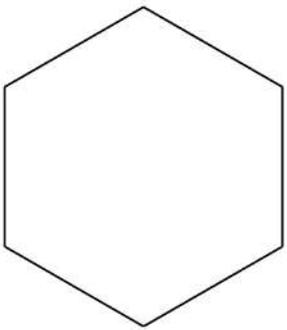


Shape Cards Grade 2
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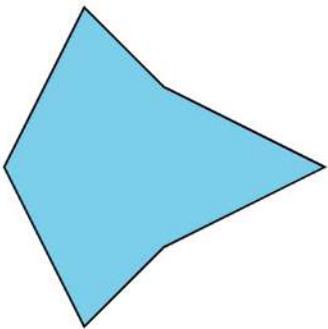


Shape Cards Grade 2

I
Shape Cards Grade 2



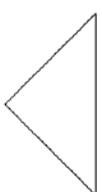
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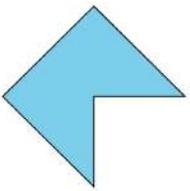
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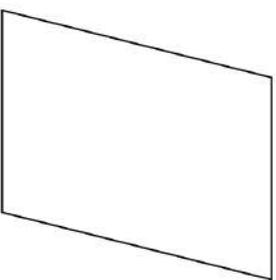
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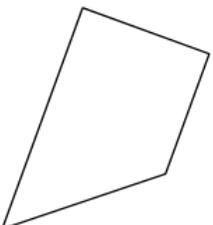
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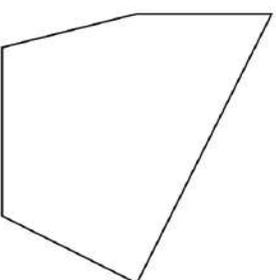
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Shape Cards Grade 2



O
Shape Cards Grade 2

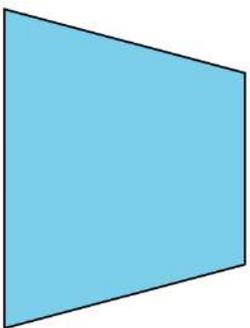


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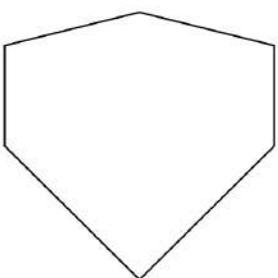


Shape Cards Grade 2

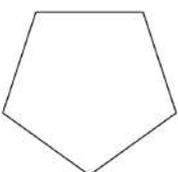
Shape Cards Grade 2
Q



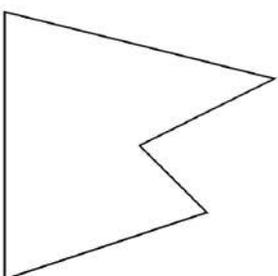
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R



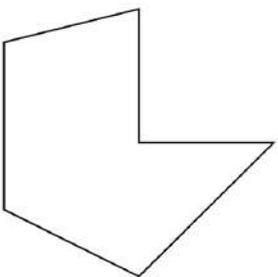
Shape Cards Grade 2
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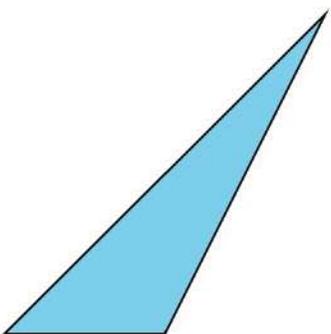
Shape Cards Grade 2
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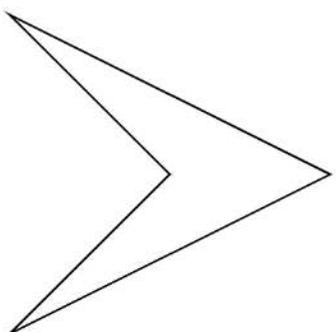
Shape Cards Grade 2
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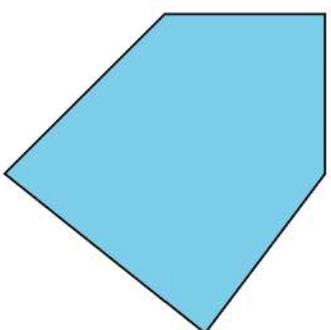
Shape Cards Grade 2
V



Shape Cards Grade 2
W



Shape Cards Grade 2
X



Shape Cards Grade 2

triangles

Shape Cards Grade 2

quadrilaterals

Shape Cards Grade 2

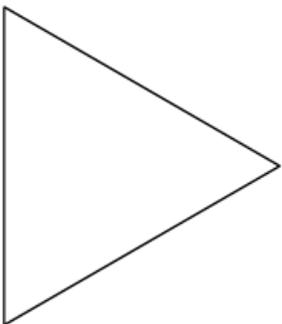
pentagons

Shape Cards Grade 2

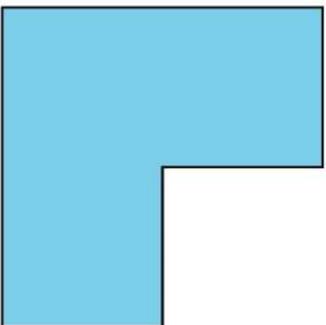
hexagons

Shape Cards Grade 2

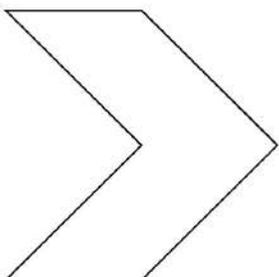
Shape Cards Grade 2
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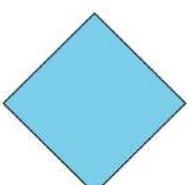
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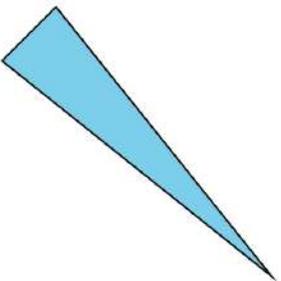
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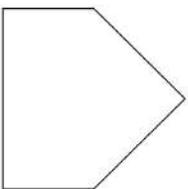
Shape Cards Grade 2
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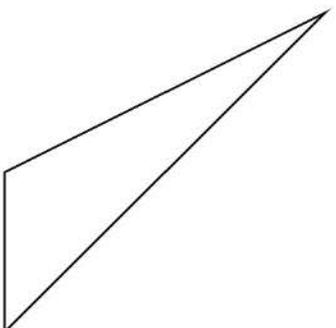
Shape Cards Grade 2
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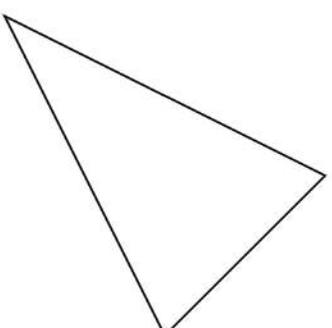
Shape Cards Grade 2
F



Shape Cards Grade 2
G

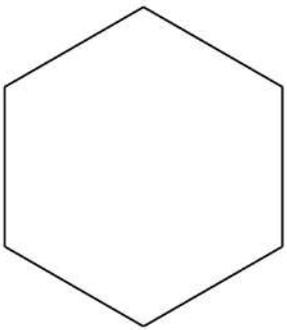


Shape Cards Grade 2
H

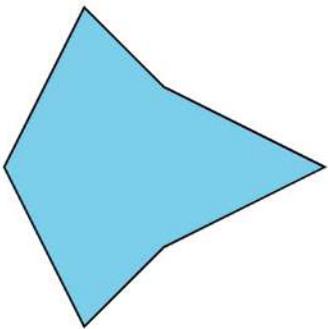


Shape Cards Grade 2

I
Shape Cards Grade 2



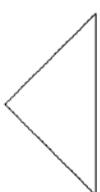
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Shape Cards Grade 2



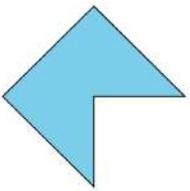
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Shape Cards Grade 2



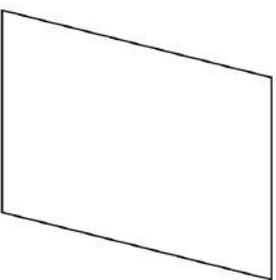
L
Shape Cards Grade 2



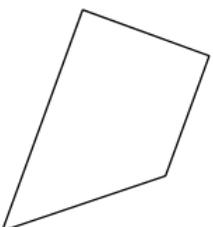
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Shape Cards Grade 2



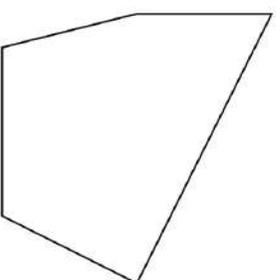
N
Shape Cards Grade 2



O
Shape Cards Grade 2

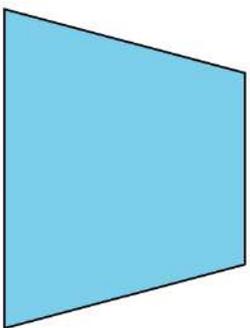


P
Shape Cards Grade 2

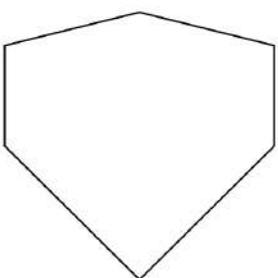


Shape Cards Grade 2

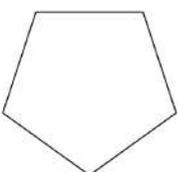
Shape Cards Grade 2
Q



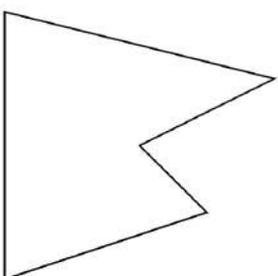
Shape Cards Grade 2
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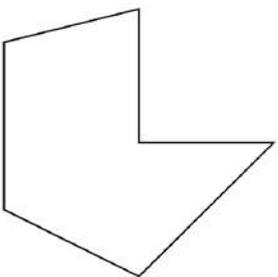
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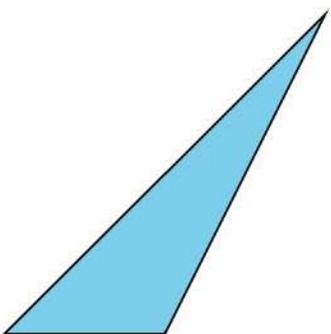
Shape Cards Grade 2
T



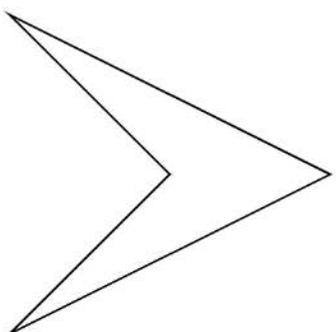
Shape Cards Grade 2
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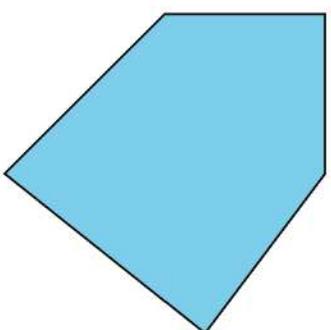
Shape Cards Grade 2
V



Shape Cards Grade 2
W



Shape Cards Grade 2
X

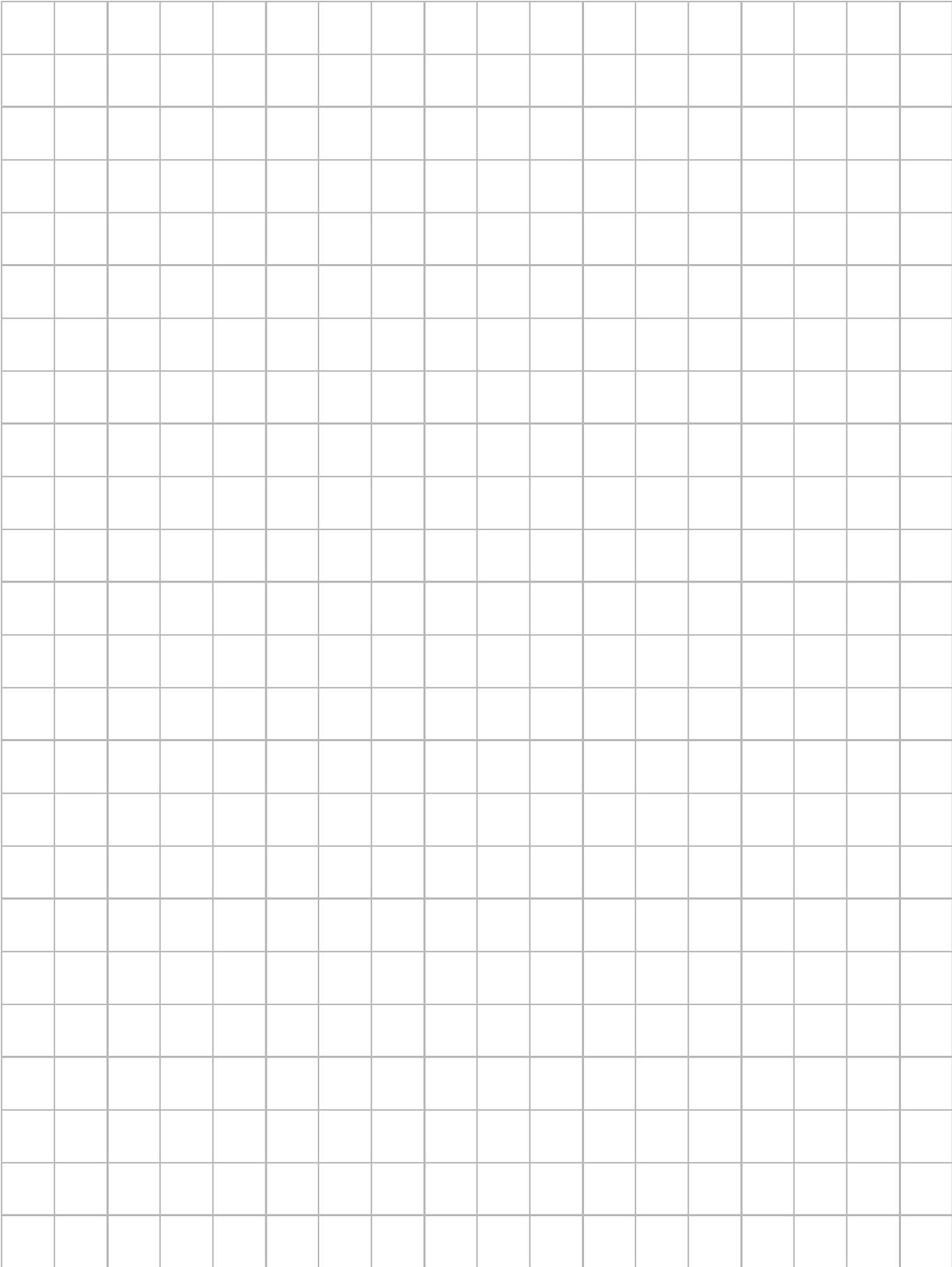


Picture Books Stage 3 Recording Sheet

Look for shapes in your book.

Sketch what you see.	Describe what you see.	What shape is it?

Centimeter Grid Paper - Standard



Can You Draw It Stage 3 Directions

Directions:

- Partner A: Choose a shape card and describe the shape to your partner.
- Partner B: Draw the shape you think is on your partner's card.
- Compare the shapes. If Partner B drew the shape correctly, they keep the card.
- Take turns. The partner with the most cards at the end of the game wins.

Can You Draw It Stage 4 Recording Sheet

Directions:

- Partner A: Draw a rectangle and tell your partner either the area or the perimeter of your shape.
- Partner B:
 - Draw the rectangle you think your partner drew.
 - Earn 2 points if your rectangle matches your partner's.
 - Earn 1 point if it doesn't match but has the correct area or perimeter.
- Take turns. The partner with the highest score at the end of 8 rounds wins.

round	drawing	points
1		
2		
3		
4		

Can You Draw It Stage 4 Recording Sheet

5		
6		
7		
8		

Compare Stage 4 Division Cards

Compare Stage 4

$$78 \div 6$$

Compare Stage 4

$$84 \div 7$$

Compare Stage 4

$$68 \div 4$$

Compare Stage 4

$$65 \div 5$$

Compare Stage 4

$$90 \div 6$$

Compare Stage 4

$$45 \div 15$$

Compare Stage 4

$$57 \div 19$$

Compare Stage 4

$$72 \div 18$$

Compare Stage 4 Division Cards

Compare Stage 4

$$52 \div 13$$

Compare Stage 4

$$84 \div 12$$

Compare Stage 4

$$42 \div 7$$

Compare Stage 4

$$56 \div 8$$

Compare Stage 4

$$72 \div 9$$

Compare Stage 4

$$64 \div 8$$

Compare Stage 4

$$81 \div 9$$

Compare Stage 4

$$72 \div 3$$

Compare Stage 4 Division Cards

Compare Stage 4

$$92 \div 4$$

Compare Stage 4

$$69 \div 3$$

Compare Stage 4

$$84 \div 4$$

Compare Stage 4

$$63 \div 3$$

Compare Stage 3-8 Directions

Directions:

- Split the deck between the players.
- Each player turns over a card.
- Compare the values. The player with the greater value keeps both cards.
- If the values are the same, each player turns over one more card. The player with the greater value keeps all four cards.
- Play until you run out of cards. The player with the most cards at the end of the game wins.

Record any sets of cards that are challenging to compare:

How Close? Stage 5 Recording Sheet

Directions:

- Each partner:
 - Take 4 cards.
 - Choose 2–3 cards to multiply.
 - Write an equation to show the product of the numbers you chose.
 - Your score for each round is the difference between your product and 100.
- Take new cards so that you have 4 cards to start the next round.
- At the end of the game, add your score for each round. The player with the lowest score wins.

round	multiplication equation	points for the round
1		
2		
3		
4		
5		
6		
7		
8		

Credits

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