Core Knowledge® MATHEMATICS

Shapes on the Coordinate Plane

Teacher Guide

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ISBN: 979-8-88970-903-9

Shapes on the Coordinate Plane

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Shapes on the Coordinate Plane

Teacher Guide

Core Knowledge Mathematics™

Unit 7: Shapes on the Coordinate Plane

At a Glance

Unit 7 is estimated to be completed in 15 days including 2 days for assessment.

This unit is divided into three sections including 13 lessons.

- Section A—The Coordinate Plane (Lessons 1-3)
- Section B—The Hierarchy of Shapes (Lessons 4-8)
- Section C—Numerical Patterns (Lessons 9-13)

On page 8 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 four student centers.

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

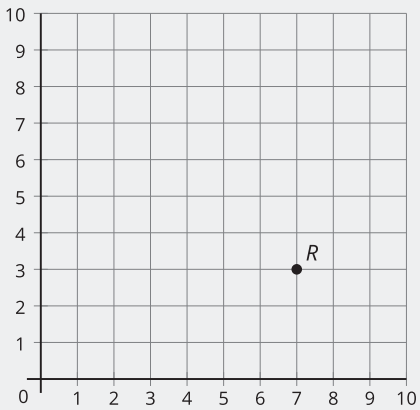
Unit 7: Shapes on the Coordinate Plane

Unit Learning Goals

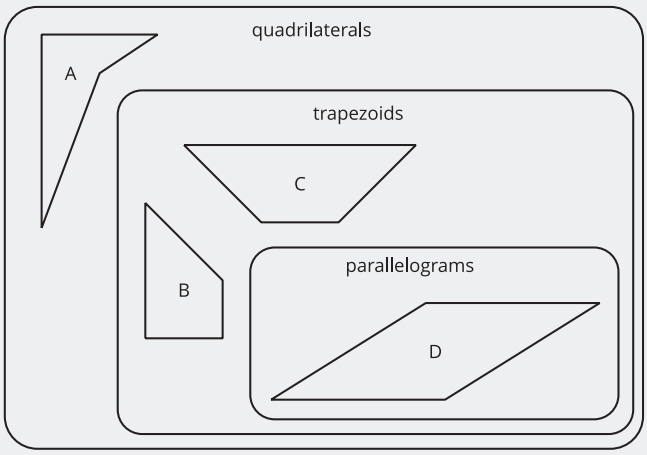
- Students plot coordinate pairs on a coordinate grid and classify triangles and quadrilaterals in a hierarchy based on properties of side length and angle measure. They generate, identify, and graph relationships between corresponding terms in two numeric patterns, given two rules, and represent and interpret real world and mathematical problems on a coordinate grid.

In this unit, students learn about the coordinate grid, deepen their knowledge of two-dimensional shapes, and use the coordinate grid to study relationships of pairs of numbers in various situations.

Here, students learn about grids that are numbered in two directions. They see that the structure of a coordinate grid allows us to precisely communicate the location of points and shapes.



Students also continue to study two-dimensional shapes and their attributes. In grade 3, they classified triangles and quadrilaterals by the presence of right angles and sides of equal length. In grade 4, they learned about angles and parallel and perpendicular lines, which allowed them to further distinguish shapes. In this unit, students use these insights to make sense of the hierarchy of shapes.



Later in the unit, students analyze and generate numerical patterns based on pairs of rules and graph pairs of numbers on the coordinate grid. They also interpret points on the coordinate grid in terms of situations, plot points to better understand the relationship between two sets of numbers, and use the coordinate grid to solve problems.

Section A: The Coordinate Plane

Standards Alignments

Addressing	5.G.A.1
Building Towards	5.G.A.1

Section Learning Goals

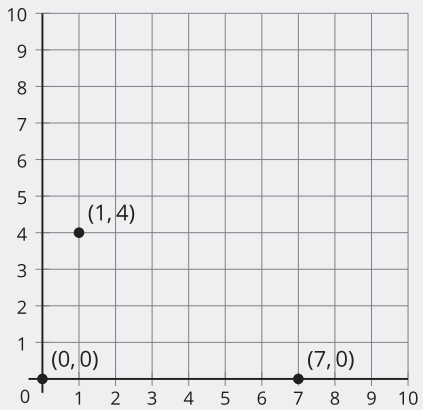
- Locate points on a coordinate grid.

This section introduces students to the coordinate grid.

Students begin by drawing rectangles based only on verbal descriptions. They first do so without a grid, then on an unmarked grid, and finally on a coordinate grid. Along the way, they recognize that numbered grid lines allow them to locate points and communicate the features of shapes precisely.

Students then learn to use the numbers on the horizontal axis and vertical axis to describe the position of points and plot them on the coordinate grid. They learn that pairs of numbers such as $(1, 4)$, called coordinates, describe the numbers of units a point is from the axes and the point $(0, 0)$, which is called the origin.

For example, $(7, 0)$ is 7 units to the right of $(0, 0)$ and is on the horizontal axis. The point $(1, 4)$ is 1 unit to the right of $(0, 0)$ and 4 units up.



In other words, the first number tells us its horizontal position, and the second number tells us its vertical position.

Students then practice plotting points given their coordinates and identifying the coordinates of points on the grid.

PLC: Lesson 2, Activity 1, What's the Point?

Suggested Centers

- Can You Draw It? (1–5), Stage 5: Grade 4 Shapes (Supporting)
- Which One? (K–5), Stage 5: Grade 4 Shapes (Supporting)
- Can You Draw It? (1–5), Stage 6: Shapes on the Coordinate Grid (Addressing)

- Which One? (K–5), Stage 6: Shapes on the Coordinate Grid (Addressing)
- How Are They the Same? (1–5), Stage 4: Grade 4 Shapes (Supporting)

Section B: The Hierarchy of Shapes

Standards Alignments

Addressing	5.G.B, 5.G.B.3, 5.G.B.4
Building Towards	5.G.B.3

Section Learning Goals

- Classify triangles and quadrilaterals in a hierarchy based on angle measurements and side lengths.

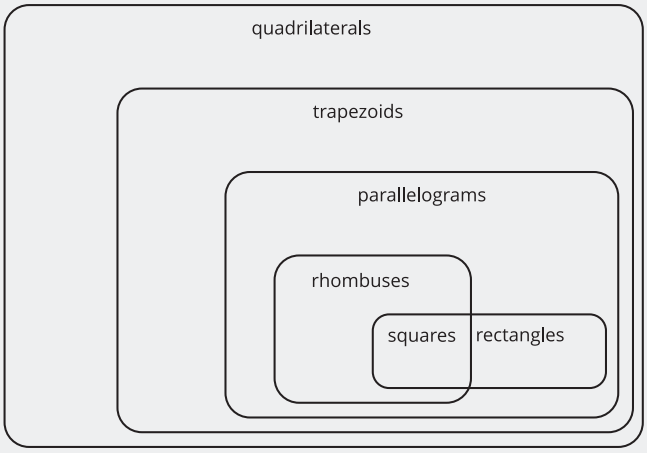
In this section, students classify quadrilaterals and triangles into different categories and study the relationships between the categories.

They begin by sorting a large set of quadrilaterals in a way that makes sense to them, using attributes such as angle measures (especially right angles) and pairs of parallel sides. Then, they focus on relating the attributes of trapezoids, rectangles, parallelograms, squares, and rhombuses.

Students explore two ways of defining trapezoids. One way is to say a parallelogram is a trapezoid, and the other is to say that a parallelogram is not a trapezoid. In this course, the former (inclusive) definition is used.

Students then study the relationship between squares and rhombuses, and between rectangles and parallelograms. They build these shapes with toothpicks, and see that a square is a special kind of rhombus and a rectangle is a special kind of parallelogram.

As they learn more about the relationships between quadrilateral categories, students use a Venn diagram to highlight their understanding.



PLC: Lesson 5, Activity 1, What's a Trapezoid?

Suggested Centers

- Can You Draw It? (1–5), Stage 6: Shapes on the Coordinate Grid (Addressing)
- Which One? (K–5), Stage 6: Shapes on the Coordinate Grid (Addressing)
- How Are They the Same? (1–5), Stage 4: Grade 4 Shapes (Supporting)
- Which One? (K–5), Stage 7: Grade 5 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 5: Grade 5 Shapes (Addressing)

Section C: Numerical Patterns

Standards Alignments

Addressing	5.G.A.2, 5.NBT.B.7, 5.OA.A.2, 5.OA.B.3
Building Towards	5.G.A.1, 5.G.A.2, 5.OA.B.3

Section Learning Goals

- Generate, identify, and graph relationships between corresponding terms in two patterns, given a rule.
- Represent and interpret real world and mathematical problems on a coordinate grid.

In this section, students apply the concepts of this unit as they analyze numerical relationships between two quantities in different contexts.

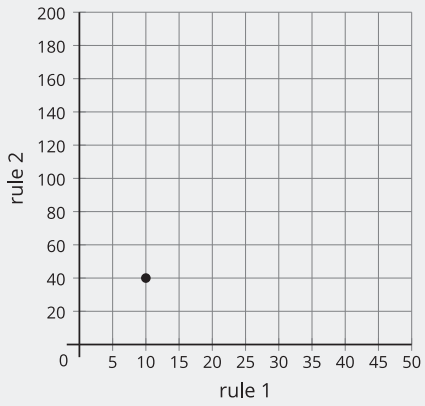
Students begin by examining patterns in numbers generated by following a pair of rules. They record the patterns in a table and interpret the relationships between the pairs of numbers. Students learn that they can form ordered pairs using corresponding terms from each pattern and these pairs can be graphed on the coordinate grid, which allows them to better understand the behavior of the patterns.

Rule 1: Start at 0. Keep adding 10.
Rule 2: Start at 0. Keep adding 40.

Use the rules to complete the table.

	A	B	C	D	E	F
rule 1						
rule 2						

Plot the numbers in the table on the coordinate grid. Label the points.



Next, students use the coordinate grid to explore the relationship of pairs of values in different situations. For instance, they look at the numbers of heads and tails that result from flipping a coin a certain number of times, the number of coins and the value of coins, and the length and width of rectangles with a fixed perimeter or a fixed area.

PLC: Lesson 11, Activity 2, Patterns on the Coordinate Grid, Part 2

Suggested Centers

- Can You Draw It? (1–5), Stage 7: Grade 5 Shapes (Addressing)
- Picture Books (K–5), Stage 3: Find Shapes (Addressing)
- Can You Draw It? (1–5), Stage 4: Area and Perimeter (Supporting)

Throughout the Unit

The True or False routine is used to revisit some of the concepts students have learned in prior units. Students look at the relationship between multiplication and division and the properties of operations, including the distributive properties.

Here is a sampling of True or False warm-ups in the unit.

lesson 10	lesson 12
$276 \div 3 = \frac{1}{3} \times 276$	$(2 \times 10) + (3 \times 5) = (3 \times 10) + (1 \times 5)$
$276 \div 3 = \frac{276}{6}$	$(3 \times 25) + (5 \times 5) = 8 \times 25$
$(276 \div 3) \times 2 = \frac{2}{3} \times 276$	$(4 \times 25) + (10 \times 5) = (2 \times 25) + (10 \times 10)$

Materials Needed

LESSON	GATHER	COPY
A.1	• none	• Can You Draw It Stage 6 Recording Sheet (groups of 1) • Explore the Coordinate Grid Cards (groups of 1)
A.2	• none	• What's the Point (groups of 2)
A.3	• none	• none
B.4	• Dry erase markers • Sheet protectors	• Guess Which One (groups of 2) • Card Sort Quadrilaterals (Grade 5) (groups of 2)
B.5	• none	• none
B.6	• Materials from a previous lesson • Toothpicks	• none
B.7	• none	• Quadrilateral Clues (groups of 2)
B.8	• none	• Card Sort Triangles (Grade 5) (groups of 2)
C.9	• none	• none
C.10	• none	• none
C.11	• none	• none
C.12	• Coins	• none
C.13	• none	• none

Center: Can You Draw It? (1–5)

Stage 4: Area and Perimeter

Lessons

- Grade5.7.C9 (supporting)
- Grade5.7.C10 (supporting)
- Grade5.7.C11 (supporting)

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)

Stage 5: Grade 4 Shapes

Lessons

- Grade5.7.A1 (supporting)
- Grade5.7.A2 (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 two-dimensional shapes, particularly triangles and quadrilaterals.

Standards Alignments

Addressing 4.G.A

Materials to Copy

Can You Draw It Stage 5 and 7 Recording Sheet (groups of 1), Shape Cards Grade 4 (groups of 2)

Stage 6: Shapes on the Coordinate Grid

Lessons

- Grade5.7.A3 (addressing)
- Grade5.7.B4 (addressing)
- Grade5.7.B5 (addressing)

Stage Narrative

Partner A picks a card and describes it to their partner. Partner B earns two points if their rectangle matches the one Partner A described exactly and one point if it doesn't match exactly, but matches the clue given.

Standards Alignments

Addressing 5.G.B

Materials to Copy

Can You Draw It Stage 6 Recording Sheet (groups of 1), Explore the Coordinate Grid Cards (groups of 1)

Stage 7: Grade 5 Shapes

Lessons

- Grade5.7.C9 (addressing)
- Grade5.7.C10 (addressing)
- Grade5.7.C11 (addressing)
- Grade5.7.C12 (addressing)
- Grade5.7.C13 (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 various polygons.

Standards Alignments

Addressing 5.G.B

Materials to Copy

Can You Draw It Stage 5 and 7 Recording Sheet (groups of 1), Quadrilateral Cards Grade 5 (groups of 2), Triangle Cards Grade 5 (groups of 2)

Stages used in Grade 4

Stage 4

Supporting

- Grade4.5.C
- Grade4.6.A
- Grade4.6.B
- Grade4.7.C
- Grade4.8.A

Stage 5

Addressing

- Grade4.8.B

Center: Which One? (K–5)

Stage 5: Grade 4 Shapes

Lessons

- Grade5.7.A1 (supporting)
- Grade5.7.A2 (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 two-dimensional shapes, particularly triangles and quadrilaterals.

Standards Alignments

Addressing 4.G.A.1, 4.G.A.2

Materials to Copy

Shape Cards Grade 4 (groups of 2)

Stage 6: Shapes on the Coordinate Grid

Lessons

- Grade5.7.A3 (addressing)
- Grade5.7.B4 (addressing)
- Grade5.7.B5 (addressing)

Stage Narrative

One partner chooses a rectangle on the coordinate plane from the board. The other partner asks questions to figure out which rectangle on the coordinate plane their partner chose.

Standards Alignments

Addressing 5.G.A.1

Materials to Copy

Which One Stage 6 Gameboard (groups of 2)

Stage 7: Grade 5 Shapes

Lessons

- Grade5.7.B6 (addressing)
- Grade5.7.B7 (addressing)
- Grade5.7.B8 (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 focus on quadrilaterals.

Variation:

One partner chooses a shape on the gameboard. The other partner asks questions to figure out what shape they chose.

Standards Alignments

Addressing 5.G.B

Materials to Gather

Sheet protectors

Materials to Copy

Guess Which One (groups of 2), Quadrilateral Cards Grade 5 (groups of 2)

Stages used in Grade 4

Stage 4

Supporting

- Grade4.7.C
- Grade4.8.A

Stage 5

Addressing

- Grade4.8.B

Center: How Are They the Same? (1–5)

Stage 4: Grade 4 Shapes

Lessons

- Grade5.7.A3 (supporting)
- Grade5.7.B4 (supporting)
- Grade5.7.B5 (supporting)
- Grade5.7.B6 (supporting)
- Grade5.7.B7 (supporting)
- Grade5.7.B8 (supporting)

Stage Narrative

Students lay six shape cards face up. One student picks two cards that have an attribute in common. All students write an attribute that is shared by both shapes. Students get a point if they name an attribute that no other student wrote.

Variation:

Students can draw a shape that has a shared attribute with the given shapes.

Standards Alignments

Addressing 4.G.A

Materials to Gather

Paper

Materials to Copy

Shape Cards Grade 4 (groups of 2)

Stage 5: Grade 5 Shapes

Lessons

- Grade5.7.B6 (addressing)
- Grade5.7.B7 (addressing)
- Grade5.7.B8 (addressing)

Stage Narrative

Students lay six shape cards face up. One student picks two cards that have an attribute in common. All students write an attribute that is shared by both shapes. Students get a point if they name an attribute that no other student wrote.

Variation:

Students can draw a shape that has a shared attribute with the given shapes.

Standards Alignments

Addressing 5.G.B

Materials to Gather

Paper

Materials to Copy

Quadrilateral Cards Grade 5 (groups of 2), Triangle Cards Grade 5 (groups of 2)

Stages used in Grade 4

Stage 4

Addressing

- Grade4.8.B

Center: Picture Books (K–5)

Stage 3: Find Shapes

Lessons

- Grade5.7.C9 (addressing)
- Grade5.7.C10 (addressing)
- Grade5.7.C11 (addressing)
- Grade5.7.C12 (addressing)
- Grade5.7.C13 (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 4

Stage 3

Supporting

- Grade4.8.A

Section A: The Coordinate Plane

Lesson 1: Explore the Coordinate Grid

Standards Alignments

Addressing	5.G.A.1
Building Towards	5.G.A.1

Teacher-facing Learning Goals

- Recognize the structure of a coordinate grid and use it to describe the location of two-dimensional shapes.

Student-facing Learning Goals

- Let's explore the coordinate grid.

Lesson Purpose

The purpose of this lesson is for students to build familiarity with the structure of the coordinate grid.

In this lesson students use the coordinates on a coordinate grid to describe the location of rectangles. Students have used the grid, without coordinates, in other courses where they drew shapes and described their properties. In this lesson, students discover the usefulness of the numbers on a coordinate grid by trying to communicate to their partner the size and location of a rectangle. It gives students a reason to attend to the features of the grid and to use language precisely (MP6). Then they further exploit the coordinates using them to pick one rectangle out of a set of closely related rectangles all lying in different locations on the coordinate grid. Students are formally introduced to the terms **coordinate grid**, **axes**, **horizontal axis**, and **vertical axis**.

Access for:

Students with Disabilities

- Engagement (Activity 1)

Instructional Routines

MLR2 Collect and Display (Activity 1), Notice and Wonder (Warm-up)

Materials to Copy

- Can You Draw It Stage 6 Recording Sheet (groups of 1): Activity 1
- Explore the Coordinate Grid Cards (groups of 1): Activity 1

Lesson Timeline

Warm-up	10 min
Activity 1	25 min
Activity 2	10 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

In what ways did students use informal language to explain the structure of the coordinate grid? How did you connect their informal language to more formal math vocabulary?

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

5 min

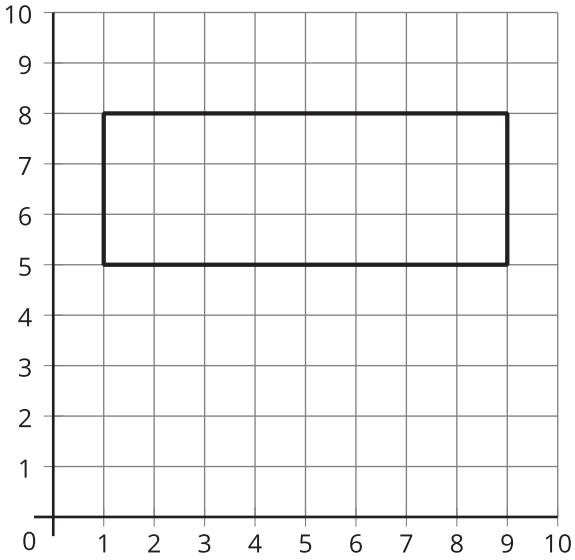
The Last Two Shapes

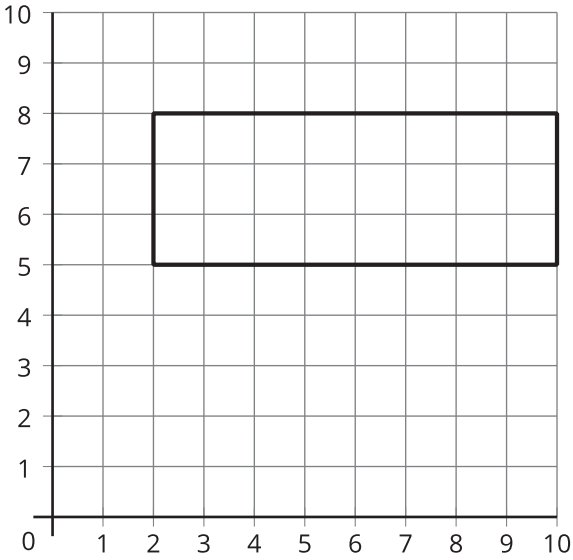
Standards Alignments

Addressing 5.G.A.1

Student-facing Task Statement

Elena and Lin were playing a round of Guess Which One. These are the last two shapes. What question can Elena ask to determine which shape is the one that Lin picked?





Student Responses

Answers vary. Sample responses:

- Is one of the sides of the rectangle on the grid line labeled with a 1?
- Is one of the sides on the grid line labeled with a 10?

Begin Lesson

Warm-up

10 min

Notice and Wonder: The Grid

Standards Alignments

Building Towards 5.G.A.1

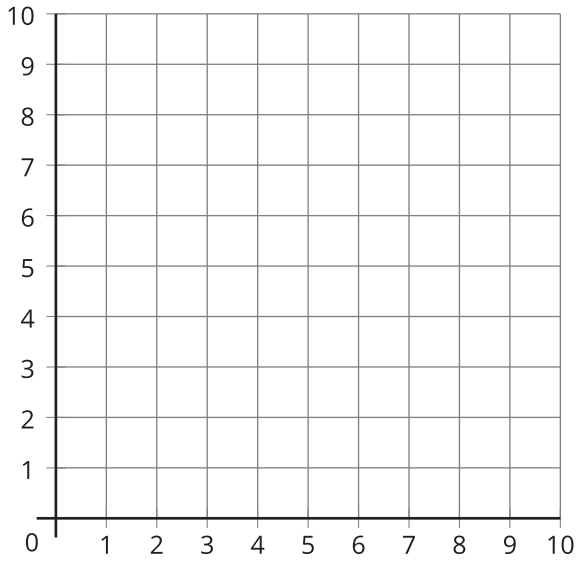
The purpose of this Notice and Wonder is for students to discuss the coordinate grid. Students have used a grid in previous grades but this is the first time they have seen the horizontal and vertical axis highlighted and numbered. The expectation is that students will focus their attention on these numbers and their significance.

Instructional Routines

Notice and Wonder

Student-facing Task Statement

What do you notice? What do you wonder?



Student Responses

Students may notice:

- It has numbers.
- There are squares.
- The lines with numbers on them are darker.
- There is only one 0 but there are 2 of the other numbers.

Students may wonder:

- Why are the lines numbered?
- Can the numbers keep going?
- What do you do with it?

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

- “What might we use this grid for?” (It looks like we could make a graph on it. We could draw shapes or points on it.)

Activity 1

25 min

Can You Draw It: Shapes on the Coordinate Grid

Standards Alignments

Addressing 5.G.A.1

The purpose of this activity is for students to use the structure of the coordinate grid to communicate and draw shapes. Students work with a partner to replicate given rectangles. One partner uses precise language and describes the rectangles and the other draws them based on their partner's verbal description. Students repeat this procedure 3 times with a different set of rectangles:

- first, the rectangles are shown without a grid.
- second, the same set of rectangles are shown on a grid.
- thirdly, the rectangles are shown on a coordinate grid.

As they go through each round, students notice that a grid can be used to locate and describe a rectangle more precisely. Gridlines with numbers allow for even more precise descriptions (MP6).

This activity uses *MLR2 Collect and Display.* Advances: Conversing, Reading, Writing.

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 round of Draw My Shape.
Supports accessibility for: Conceptual Processing; Attention, Organization

Instructional Routines

MLR2 Collect and Display

Materials to Copy

Can You Draw It Stage 6 Recording Sheet (groups of 1), Explore the Coordinate Grid Cards (groups of 1)

Required Preparation

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

Student-facing Task Statement

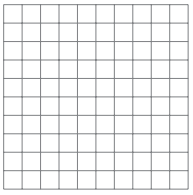
1. Play three rounds of Draw My Shape using the three sets of cards from your teacher.

   For each round:

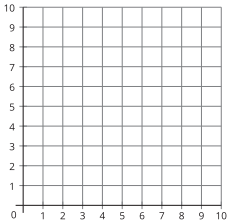
   - Partner A choose a card—without showing your partner—and describe the shape on the card.
   - Partner B draw the shape as described.
   - Partner A reveal the card and partner B reveal the drawing.
   - Compare the shapes and discuss: What's the same? What's different?

   Round 1

   Round 2

   Round 3

2. Look at partner B's drawings for each round. When does partner B's drawing look most like the shape on the card? Explain why you think that is so.

Student Responses

1. Sample response for describing the shape on the first card:
   - Round 1: There is a rectangle in the upper left corner of the card. It's about an inch wide and less than an inch tall.
   - Round 2: The top side of the rectangle starts on the second

Launch

- Groups of 2
- "We are going to play a drawing game."
- "Decide who will be partner A and who will be partner B."
- Consider playing one round of the game with a student for all to see.

Activity

MLR2 Collect and Display

- 5 minutes: each round
- Circulate, listen for, and collect the language students use to describe the location of each figure on the coordinate grid. Listen for students who:
  - use the grid to determine the side lengths or area of the rectangle.
  - describe the general location of the rectangle.
  - use the numbers on the axes as reference points when describing the rectangle.
- Record students' words and phrases on a visual display and update it throughout the lesson.

Synthesis

- "Here are some of the words and phrases you used as you worked with your partners."
- "We may add additional words or phrases that are important to include on our display as we continue to share and discuss the activity. You could use the language on the display to explain your thinking."

gridline from the top. The left side of the rectangle is at the left edge of the grid. The rectangle is 3 units across and 2 units down.

- Round 3: The left side of the rectangle is on the left edge of the grid, going from number 7 up to 9. The right side is 3 units to its right.

2. Sample responses: They are most the same in the last two rounds. The gridlines could be counted, making it easier to describe the location and size of the rectangles.

- As students share responses, update the display, by adding (or replacing) language, diagrams, or annotations.
- Ask previously selected students to explain their thinking.
- "How did the gridlines help you?" (They helped us draw the shapes more accurately.)
- "How did the numbers help you?" (We could use them to describe where the shape was located.)
- Display the image from the warm-up: "This grid, with numbers labeling the gridlines, is called a **coordinate grid**. We are going to learn more about the coordinate grid in the next few lessons. How would you describe the coordinate grid?" (It has vertical lines with numbers on them and horizontal lines with numbers on them. It has squares on it. There are two of each number except 0. The horizontal and vertical lines intersect.)

Advancing Student Thinking

If students do not use the details of the grid lines and numbers to describe the location of the shape, suggest the student listens to another student describe a shape and ask, "What words did you hear that helped you picture the location of the shape?"

Activity 2

10 min

Guess Which One: Shapes on the Coordinate Grid

Standards Alignments

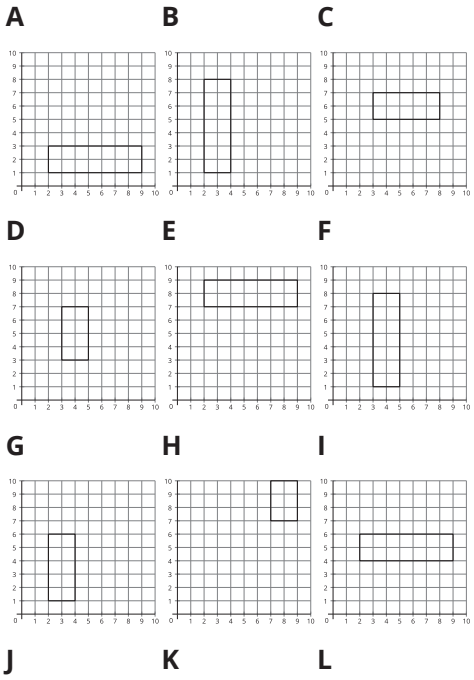
Addressing 5.G.A.1

The purpose of this activity is for students to use informal language and the structure of the

coordinate grid to describe a given shape. Some questions may be about properties of the shape rather than its location. For example, “Is the rectangle wider than it is tall?” is a question that eliminates many shapes. As the number of shapes decreases, the location will become more important and the features of the coordinate grid will play a larger role. The synthesis gives students an opportunity to consider how the numbers in the coordinate grid can be useful to accurately describe the attributes, location, and orientation of a given shape (MP6).

Student-facing Task Statement

1. Play a round of Guess Which One.
    - Sit next to your partner.
    - Partner A:
      Mentally choose a shape card without indicating which shape card you chose.
    - Partner B:
      Ask yes or no questions to determine which shape card partner A has chosen.



Launch

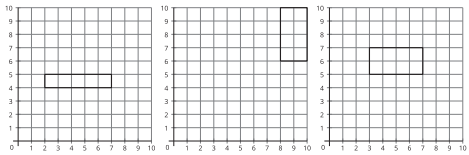
- Groups of 2

Activity

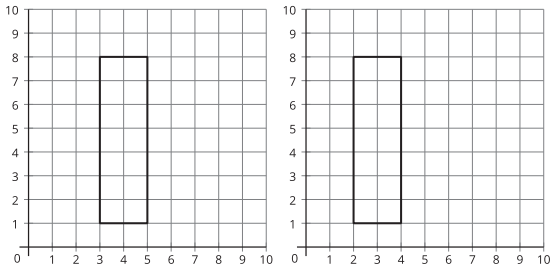
- 5 minutes: partner work time
- Monitor for students who:
    - reference the structure of the grid in their questions
    - reference the numbers on the horizontal and vertical axes in their questions
    - use gestures to indicate horizontal or vertical gridlines
    - use the words horizontal or vertical

Synthesis

- Ask previously identified students to share their reasoning.
- “How do the numbers help us locate shapes on the grid?” (I could use them to describe the lines and the points. I could also use numbers to describe the location of the shape: “Go up three. Go over 5.”)
- “The gridlines with numbers on them are called **axes**. The coordinate grid has a **horizontal axis** and a **vertical axis**.”



2. Switch roles and play another round of Guess Which One.
3. Diego and Kiran were playing a round of Guess Which One. These are the last two shapes. What question can Kiran ask to determine which shape is the one that Diego picked?



Student Responses

1. no response required
2. no response required
3. Sample response: Is one of the sides of your rectangles on a gridline that is numbered 3?

Advancing Student Thinking

If students do not reference the grid lines or numbers when asking questions, refer to the display from the first activity and ask, “Which words can you use to help you figure out which shape your partner chose?”

Lesson Synthesis

10 min

“Today we learned about the coordinate grid and used it to describe the location of rectangles.”

Display the grid from the warm up, along with student responses.

"This was the image from our warm-up. What did we learn about it?" (It is called a coordinate grid. The darker lines with numbers near them are called the horizontal axis and vertical axis. We can use the numbers to help us describe the location of rectangles.)

Record responses for all to see.

Suggested Centers

- Can You Draw It? (1–5), Stage 5: Grade 4 Shapes (Supporting)
- Which One? (K–5), Stage 5: Grade 4 Shapes (Supporting)

Complete Cool-Down

Response to Student Thinking

Student response does not reference the numbers on either scale of the grid.

Next Day Support

- Give students access to the language display from this lesson during the first activity of the next lesson.

Lesson 2: Points on the Coordinate Grid

Standards Alignments

Addressing	5.G.A.1
Building Towards	5.G.A.1

Teacher-facing Learning Goals

- Locate and name given points on the coordinate grid by using an ordered pair of numbers, called coordinates.

Student-facing Learning Goals

- Let's plot points on the coordinate grid.

Lesson Purpose

The purpose of this lesson is for students to locate and describe points on the coordinate grid.

In this lesson students use the numbers on the horizontal and vertical axes to describe the location of points in the plane and then learn that these numbers are called the **coordinates** of points. They learn that the point $(5, 2)$, for example, is on the vertical line labeled 5 and the horizontal line labeled 2. The number 5 is called the horizontal coordinate of $(5, 2)$ and the number 2 is called its vertical coordinate. Students practice identifying the coordinates of points and plot points with given coordinates. It gives students a reason to attend to the location and coordinates of each point and to use language precisely to describe them (MP6).

Access for:

Students with Disabilities

- Representation (Activity 2)

Instructional Routines

MLR1 Stronger and Clearer Each Time (Activity 1), Notice and Wonder (Warm-up)

Materials to Copy

- What's the Point (groups of 2): Activity 1

Lesson Timeline

Warm-up	10 min

Teacher Reflection Question

Who participated in math class today? What

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

assumptions are you making about those who did not participate? How can you leverage each of your student's ideas to support them in being seen and heard in tomorrow's math class?

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

5 min

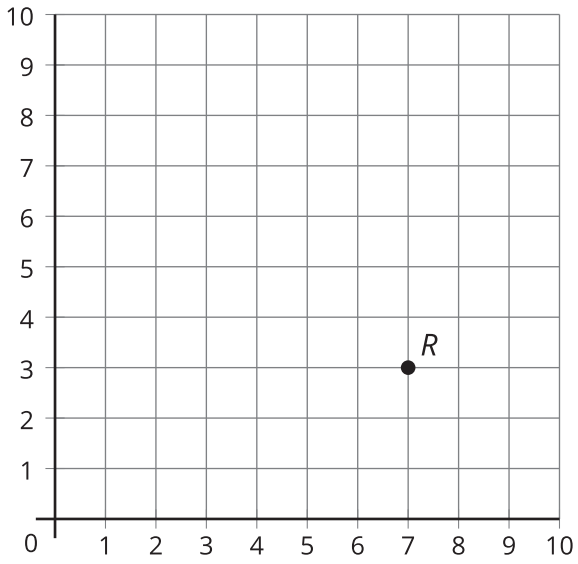
Coordinates

Standards Alignments

Addressing 5.G.A.1

Student-facing Task Statement

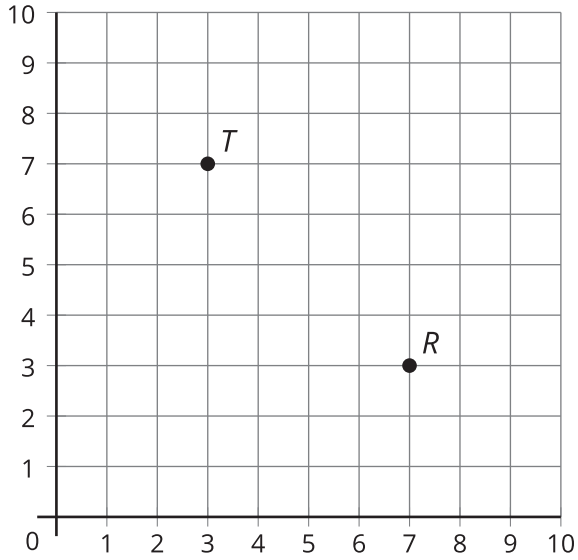
1. What are the coordinates of point R ?



2. Plot point T at (3,7).

Student Responses

1. $(7, 3)$

2. 

Begin Lesson

Warm-up

10 min

Notice and Wonder: A Point

Standards Alignments

Building Towards 5.G.A.1

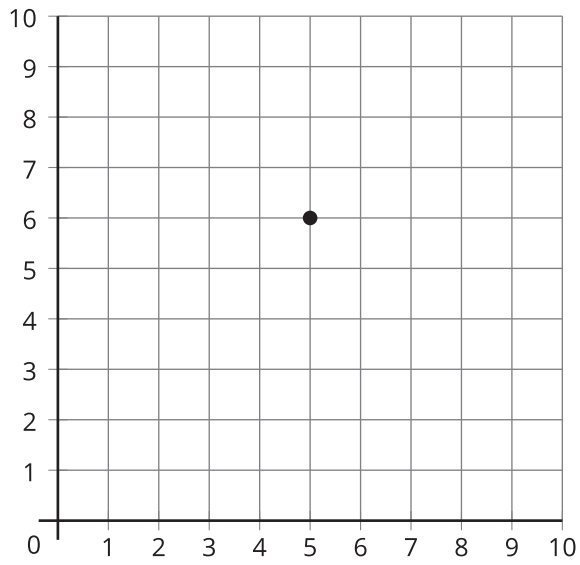
The purpose of this warm-up is for students to describe a point which will be useful when students locate points on a coordinate grid in a later activity. While students may notice and wonder many things about this image, the relationship between the point and the numbers on the vertical and horizontal axes is the main focus of the discussion.

Instructional Routines

Notice and Wonder

Student-facing Task Statement

What do you notice? What do you wonder?



Student Responses

Students may notice:

- There is a point.
- The point is where two lines cross.
- The point is on the line marked 5.
- The point is on the line marked 6.

Students may wonder:

- Why is there only 1 point?
- Why aren't there any rectangles?
- Can we put more points on the grid?

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 can we describe the location of the point?" (It is kind of in the middle of the grid, but toward the top. It is where two lines intersect. It is where line 5 and line 6 cross each other.)

Activity 1

20 min

What's the Point?

PLC Activity

Standards Alignments

Addressing 5.G.A.1

The purpose of this activity is for students to describe coordinates for points. After playing a round of What's the Point, students have an opportunity to write a description of the location of a point in the coordinate plane. The structure of this part of the activity mirrors what students did in the previous lesson when they were describing a rectangle. Some students may use the coordinates on the grid while others may use words to describe the location of the point.

Students make choices about how to revise their thinking based on what makes the description stronger and clearer to them. This activity not only supports students developing language to describe the location of a point but also develops a deeper understanding of the coordinate grid (MP6). Invite students to use language from the display from an earlier lesson if they find it helpful.

This activity uses *MLR1 Stronger and Clearer Each Time*. Advances: Reading, Writing.

Instructional Routines

MLR1 Stronger and Clearer Each Time

Materials to Copy

What's the Point (groups of 2)

Required Preparation

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

Student-facing Task Statement

1. Play 2 rounds of What's the Point so each partner gets a chance to draw.
    - Sit back to back with your partner.
    - Partner A: Choose a card. Then, describe the location of the point to your partner.
    - Partner B: Draw the point on the blank coordinate grid.
    - Compare the card with your partner's diagram.
    - Discuss: What's the same? What's different?

Launch

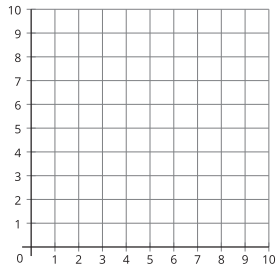
- Groups of 2.

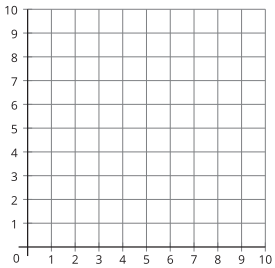
Activity

- 10 minutes: partner work time
- Monitor for students who:
    - revise their thinking
    - refer to the numbers on the coordinate grid to communicate the location of the point

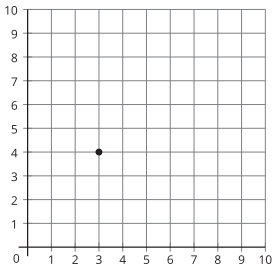
MLR1 Stronger and Clearer Each Time

- "Share your description of the location of the point on the grid with your partner. Take turns being the speaker and the





2. Use words to explain the location of the point on the grid.



Student Responses

1. Sample responses for card F:
   - The point on the left side of the grid toward the middle.
   - The point is on the left side of the grid at the 6.
   - The point is on grid line 6 on the vertical axis.
2. Sample responses:
   - The point is on grid lines 3 and 4. Go over 3 and up 4.
   - The point is on the corner of line 3 and 4.
   - The point is on grid line number 3 that goes up and down and on grid line number 4 that goes across.

listener. If you are the speaker, share your ideas and writing so far. If you are the listener, ask questions and give feedback to help your partner improve their work."

- 3–5 minutes: structured partner discussion
- Repeat with 1–2 different partners.
- If needed, display question starters and prompts for feedback, such as:
  - "Can you use the numbers on the coordinate grid in your explanation?"
- "Revise your initial draft based on the feedback you got from your partner."
- 2–3 minutes: independent work time

Synthesis

- Select previously identified students to share how they revised their explanation for the location of the point in the last problem.
- Display the image of the coordinate grid with a point from the student workbook.
- "The point can be described using the **coordinates** $(3, 4)$. Where do you think these coordinates come from?" (They describe the location of the point. The point is on gridline 3 and gridline 4. The point is where these gridlines intersect.)

Advancing Student Thinking

If students do not reference the axes or the directionality of the gridlines, show them point $(3, 4)$ and point $(4, 3)$ on a grid and ask, "What is the same and different about these two points?"

Activity 2

15 min

Plot and Label Points

Standards Alignments

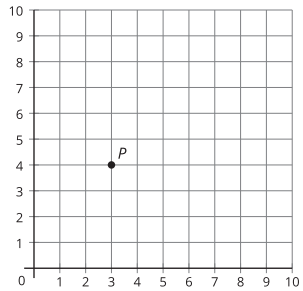
Addressing 5.G.A.1

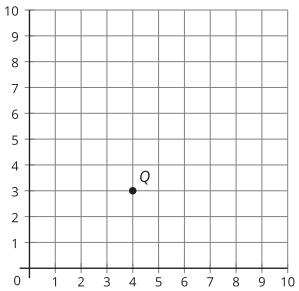
The purpose of this activity is for students to write ordered pairs of numbers to represent points in the coordinate plane and to plot points with given coordinates. Students may interpret the horizontal and vertical coordinates backward. With time and practice they will learn the convention that the first coordinate represents the horizontal location of the point and the second coordinate represents its vertical location.

Access for Students with Disabilities

Representation: Internalize Comprehension. Synthesis: Invite students to identify which details were most important to list coordinates. Display the sentence frame, "The next time I name coordinates and plot points, I will look for/pay attention to . . . ."
Supports accessibility for: Memory, Attention, Conceptual Processing

Student-facing Task Statement



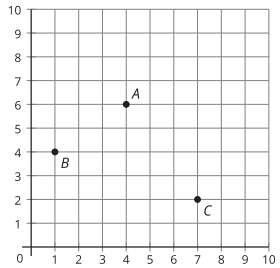


1. List the coordinates for each point.

	coordinates
A	(___ , ___)
B	(___ , ___)
C	(___ , ___)

Launch

- Groups of 2
- Display images of points P and Q from student workbook.
- Poll the class:
  "What are the coordinates of point P and Q?"
- "The coordinates for these points have the same numbers. We have a convention that we always list the number that corresponds with the horizontal axis first and the number that corresponds with the vertical axis second. The coordinates for point P are $(3, 4)$. How do these coordinates represent point P?" (The 3 is on the horizontal axis and the 4 is on the vertical axis.)



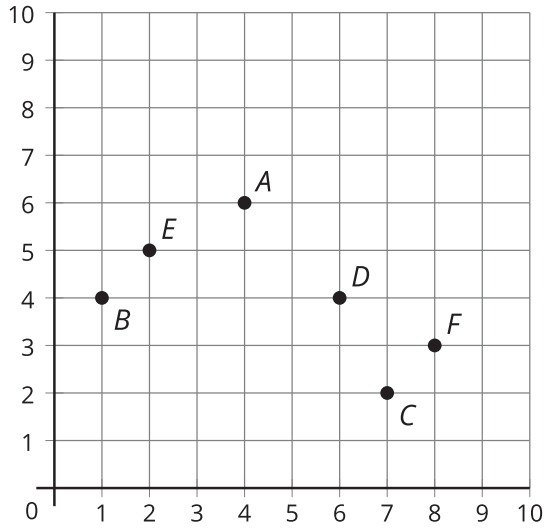
2. Plot points D, E, F on the same grid.

	coordinates
D	$(6, 4)$
E	$(2, 5)$
F	$(8, 3)$

Student Responses

1.

	coordinates
A	$(4, 6)$
B	$(1, 4)$
C	$(7, 2)$

2. 

- "What are the coordinates for point Q?" $(4, 3)$
- "In this activity, you are going to name coordinates of points and plot points with given coordinates."

Activity

- 5 minutes: independent work time
- 5 minutes: partner discussion

Synthesis

- "What is challenging about naming the coordinates for a point?" (I need to remember which coordinate goes first and which one goes second. I have to be careful to make sure I get the right horizontal and vertical location of the point.)
- "What is challenging about plotting points on the coordinate grid?" (I have to remember which coordinate goes with which axis. It is hard to remember the coordinates while you are also trying to find them on the grid. I could find each coordinate but finding the point with both of those coordinates is hard.)

Lesson Synthesis

10 min

Display a blank coordinate grid from the first activity.

"What new information did we learn about the structure of coordinate grids?" (We can use the numbers on the axes to plot and label points on the grid.)

Display the coordinates for all to see: $(4, 7)$ and $(7, 4)$.

"What do we know about the points with these coordinates?" (They each have a 7 and a 4 but the 7 and 4 are in different places. So $(4, 7)$ has a horizontal coordinate of 4 and a vertical coordinate of 7 and $(7, 4)$ has a horizontal coordinate of 7 and a vertical coordinate of 4.)

"How do we plot each of these coordinate pairs?" (The first coordinate says how far to go across horizontally and the second coordinate says how far to go up vertically.)

Plot the points $(4, 7)$ and $(7, 4)$ on the blank grid according to the directions students give.

Suggested Centers

- Can You Draw It? (1–5), Stage 5: Grade 4 Shapes (Supporting)
- Which One? (K–5), Stage 5: Grade 4 Shapes (Supporting)

Complete Cool-Down

Response to Student Thinking

Students do not plot the point correctly.

Next Day Support

- During the warm-up of the next lesson, ask students to plot and name points on the coordinate grid.

Lesson 3: Plot More Points

Standards Alignments

Addressing	5.G.A.1
Building Towards	5.G.A.1

Teacher-facing Learning Goals

- Locate and name coordinates on a coordinate grid by reasoning about the structure of coordinate pairs.

Student-facing Learning Goals

- Let's locate and name points on the coordinate grid.

Lesson Purpose

The purpose of this lesson is for students to plot points on the coordinate grid and recognize the importance of attending to precision when naming coordinates.

In previous lessons, students saw how coordinates are an effective tool for locating and describing points on the coordinate grid. In this lesson, they examine how points sharing the same vertical or horizontal coordinate are related. For example, the points $(3, 1)$, $(5, 1)$, and $(6, 1)$ all have 1 as their second coordinate. Students see that they all lie on a horizontal line. Students study points that lie on the horizontal or vertical axes and see 0 as a possible value for a coordinate.
This lesson has a Student Section Summary.

Access for:

Students with Disabilities

- Action and Expression (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Notice and Wonder (Warm-up)

Lesson Timeline

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

Teacher Reflection Question

What questions did you ask to deepen student understanding of the structure of the coordinate plane?

Lesson Synthesis	10 min
Cool-down	5 min

Cool-down (to be completed at the end of the lesson) 5 min

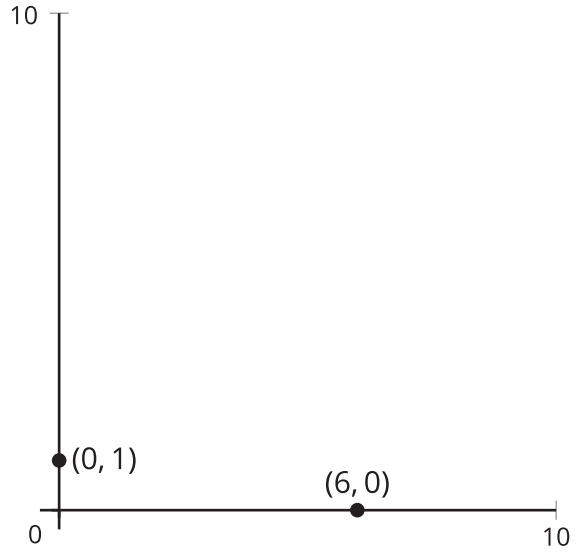
Missing Coordinate

Standards Alignments

Addressing 5.G.A.1

Student-facing Task Statement

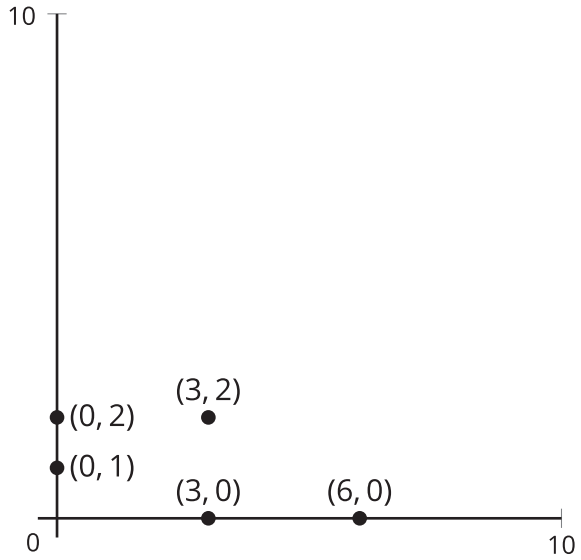
Here is a coordinate plane with some points labeled.



Plot and label the points $(3, 0)$, $(0, 2)$ and $(3, 2)$. Explain or show your reasoning.

Student Responses

Sample responses: For $(3, 0)$ I took half the distance to $(6, 0)$ and for $(0, 2)$ I took twice the distance to $(0, 1)$. Then $(3, 2)$ has horizontal coordinate 3 and vertical coordinate 2.



Begin Lesson

Warm-up

10 min

Notice and Wonder: Points with Zero

Standards Alignments

Building Towards 5.G.A.1

The purpose of this warm-up is for students to think about points on the axes. In previous lessons they have plotted points with non-zero coordinates. Thinking about the points with zero prepares them for plotting points on the horizontal and vertical axes which they will do in this lesson.

Instructional Routines

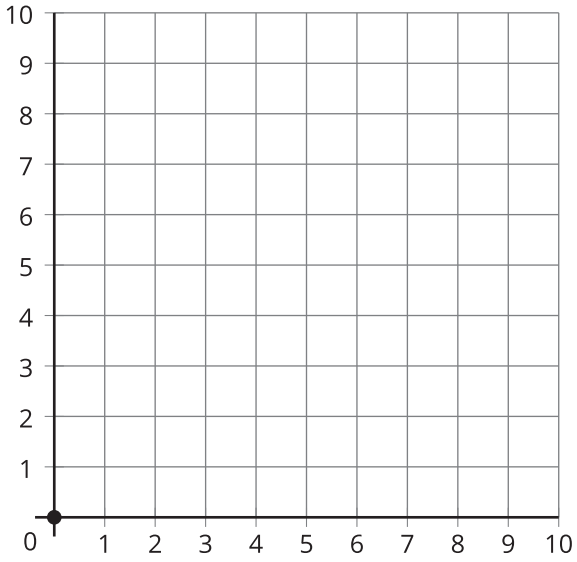
Notice and Wonder

Student-facing Task Statement

What do you notice? What do you wonder?

Launch

- Groups of 2
- Display the image.



Student Responses

Students may notice:

- There is a point on the zero.
- There are no other points.
- It looks like the same coordinate grid we have been using in the other lessons.

Students may wonder:

- What are the coordinates of the point?
- Is the point on the horizontal axis or the vertical axis?
- Is there just one coordinate for that point?

- "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 can we describe the location of the point?" (It is at the bottom left of the grid.)
- "The coordinates of this point are $(0, 0)$. What would be the coordinates of the point if we moved it up 2 units?" (0, 2)

Activity 1

20 min

What's the Point?

Standards Alignments

Addressing 5.G.A.1

The purpose of this activity is for students to plot several points with the same vertical or

horizontal coordinate and observe that they lie on a horizontal or vertical line respectively (MP7). Students also plot points on the axes for the first time. Before plotting the points on a grid with gridlines, students first estimate the location of the points. This encourages them to think about the coordinates as distances (from the vertical axis for the first coordinate and from the horizontal axis for the second coordinate).

Access for English Learners

MLR8 Discussion Supports. Display sentence frames to support partner discussion: "First, I _____ because . . ." and "I noticed _____ so I . . . ."
Advances: Conversing, Representing

Access for Students with Disabilities

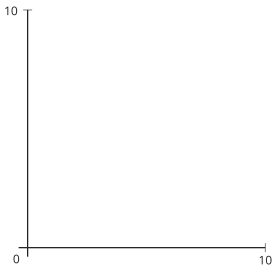
Action and Expression: Internalize Executive Functions. Invite students to verbalize their strategy for estimating and plotting points before they begin. Students can speak quietly to themselves, or share with a partner.
Supports accessibility for: Organization, Conceptual Processing, Language

Student-facing Task Statement

Partner A

1. Estimate the location of each point.

Point	Coordinates
A	$(5, 1)$
B	$(5, 2)$
C	$(5, 3)$
D	$(5, 4)$



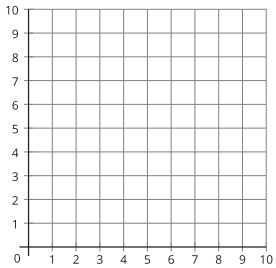
2. Plot and label the points on the coordinate grid.

Launch

- Groups of 2
- "You and your partner will each complete a different set of 4 problems independently. After you're done, discuss your work with your partner."

Activity

- 5–7 minutes: independent work time
- 5 minutes: partner discussion
- Monitor for students who:
  - use the halfway point on each axis as a benchmark for the coordinate grid without gridlines
  - start at zero and count spaces along each axis for the marked coordinate grid with gridlines
  - recognize the points should be aligned because they share a common horizontal or vertical

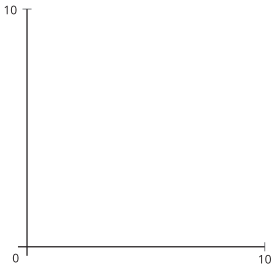


3. What do the points have in common?
4. Plot the point with coordinates $(5, 0)$ on the coordinate grid.

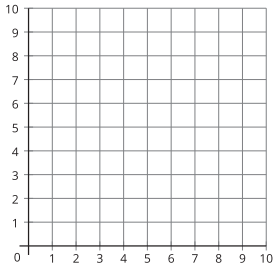
Partner B

1. Estimate the location of each point.

Point	Coordinates
A	$(4, 3)$
B	$(5, 3)$
C	$(6, 3)$
D	$(7, 3)$



2. Plot and label the points on the coordinate grid.



3. What do the points have in common?
4. Plot the point with coordinates $(0, 3)$ on the coordinate grid.

Student Responses

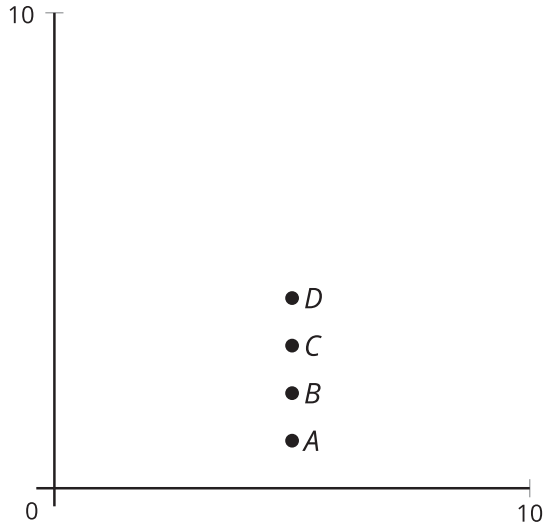
Partner A

1. Sample response:

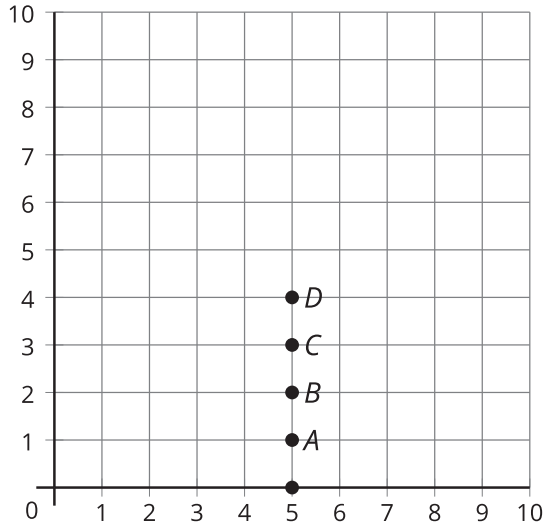
coordinate

Synthesis

- Ask previously identified students to share their thinking.
- "What can we say about a set of points when they share the same first coordinate?" (They will be on the same vertical line.)
- Display image from student solution showing points with first coordinate 5.
- "How did you know where to put the point with coordinates $(5, 0)$?" (I put it on the horizontal axis. I went over 5 but did not go up at all.)
- "What happens when a set of points share the same second coordinate?" (They will be on the same horizontal line.)
- Display image from student solution showing points with second coordinate 3.
- "What does the zero in (0,3) tell us?" (It means the point will be on line zero of the horizontal axis, which is the vertical axis.)
- "$(0, 0)$ is an important point because it's where we start when we plot a point on the coordinate grid. Find $(0, 0)$ on the grid you have been working with."



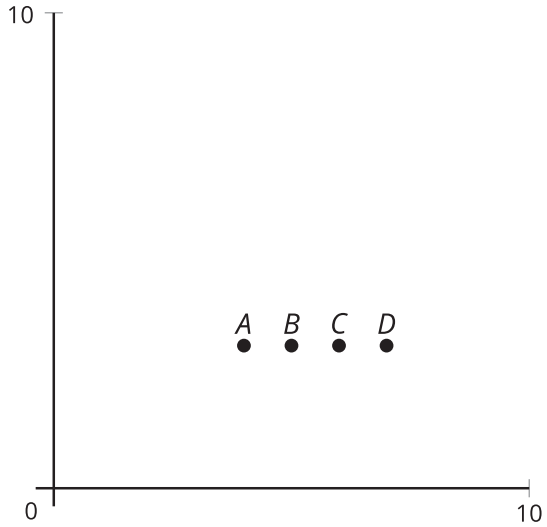
2. Response for this question and question 4:



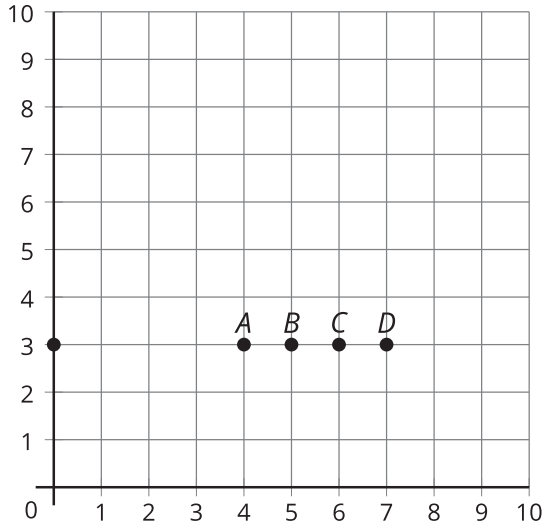
3. Sample response: The points are on a vertical line, the one labeled 5.
4. See graph in question 2.

Partner B

1. Sample response:



2. Response for this question and question 4:



3. Sample response: The points are on a horizontal line, the one labeled 3.
4. See graph in question 2.

Advancing Student Thinking

If students do not reasonably estimate a location for a point on the blank grid, point to the location half way between 0 and 5 on the horizontal axis and ask, “What number might go here?”

Activity 2

15 min

Plotting Points Without a Grid

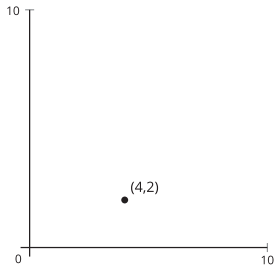
Standards Alignments

Addressing 5.G.A.1

In the previous activity, students noticed that points with the same vertical coordinate lie on a horizontal line and points with the same horizontal coordinate lie on a vertical line. The purpose of this activity is to reinforce this idea by asking students to plot points on a blank coordinate grid given a single point. Using this point, they can plot other points with the same horizontal or vertical coordinate. Some students may keep one coordinate the same and double or halve the other as is shown in the student solution. Other students may label points on the axes. The given point, for example, allows students to identify $(4, 0)$ and $(0, 2)$. An advantage to working with points on the axes is that these are essentially number lines with which students have been working for several years. The synthesis highlights the special nature of the points $(1, 0)$ and $(0, 1)$. All of the points where the gridlines meet can be measured off exactly after $(1, 0)$ and $(0, 1)$ are plotted.

Student-facing Task Statement

1. A point is labeled in the coordinate plane. Plot and label some other points. Explain or show your reasoning.



2. Can you plot $(1, 0)$ and $(0, 1)$ accurately? Explain or show your reasoning.

Student Responses

1. Sample responses: I kept the same

Launch

- Groups of 2

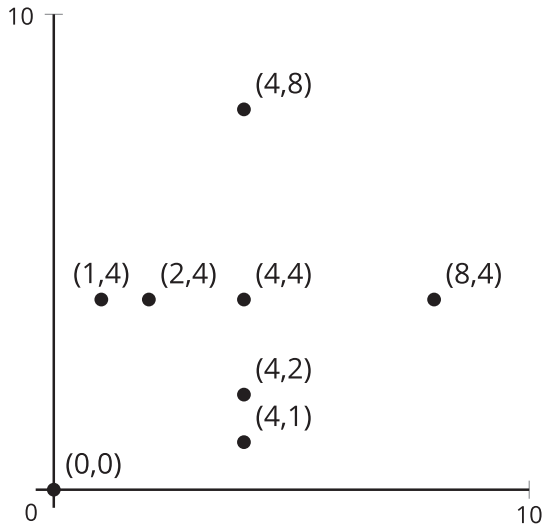
Activity

- 3–5 minutes: independent work time
- 5 minutes: partner discussion

Synthesis

- Invite students to share the points that they plotted and their reasoning.
- Plot the points as they discuss their reasoning.
- "How did you plot $(1, 0)$?" (I know where $(2, 0)$ is on the vertical axis because it has the same horizontal coordinate as $(2, 4)$. Then I just halved the distance to the

horizontal coordinate and doubled the vertical coordinate and knew that was $(4, 4)$. I doubled again and that gave me $(4, 8)$. I also halved the distance and that gave me $(4, 1)$. I did the same thing keeping the vertical coordinate of $(4, 2)$ and doubling or halving the horizontal coordinate. I also knew right away where to put $(0, 0)$.



2. Sample responses: I can plot $(1, 0)$ because I know where $(1, 4)$ is and if I go straight down that's $(1, 0)$. I can also plot $(0, 1)$ because I know where $(4, 1)$ is and if I go straight across that's $(0, 1)$.

vertical axis and that's $(1, 0)$.)

- "Once you know where $(1, 0)$ is, what other points can you locate on the vertical axis?" ((2,0), (3,0), (4,0),... I can just keep marking off that distance like I do when I am on a number line.)

Advancing Student Thinking

If students need support getting started with the task, ask, "What do you know about the point $(4, 2)$ that is plotted?"

Lesson Synthesis

10 min

"Today we plotted points that lie on the same horizontal or vertical line, including the horizontal and vertical axes."

Display the first image from student A solution in first activity.

"Do these points have the same horizontal coordinate or vertical coordinate? How do you know?" (They all sit over the same place on the horizontal axis. That tells you the horizontal coordinate and it's the same for all of the points.)

"Do any of the points have vertical coordinate 0? How do you know?" (No, if the vertical coordinate were 0, the points would be on the horizontal axis.)

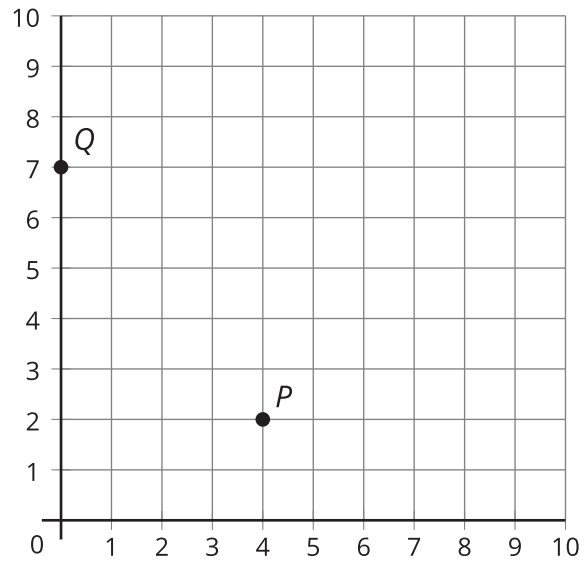
"In the next section, we will be exploring rectangles and other quadrilaterals and sometimes we'll put them on the coordinate grid."

Suggested Centers

- Can You Draw It? (1–5), Stage 6: Shapes on the Coordinate Grid (Addressing)
- Which One? (K–5), Stage 6: Shapes on the Coordinate Grid (Addressing)
- How Are They the Same? (1–5), Stage 4: Grade 4 Shapes (Supporting)

Student Section Summary

In this section, we plotted and described points on the coordinate grid.



The point P is 4 units from the vertical axis and 2 units from the horizontal axis. Its coordinates are $(4, 2)$. The point Q is 0 units from the vertical axis since it is on the vertical axis. It is 7 units from the horizontal axis. Its coordinates are $(0, 7)$.

The first coordinate of a point tells us its horizontal position and the second coordinate gives its vertical position.

Complete Cool-Down

Response to Student Thinking

Students do not plot the points correctly.

Next Day Support

- Before the next lesson, go over a correct response from the cool down in today's lesson.

Section B: The Hierarchy of Shapes

Lesson 4: Sort Quadrilaterals

Standards Alignments

Addressing	5.G.B.3, 5.G.B.4
Building Towards	5.G.B.3

Teacher-facing Learning Goals

- Classify quadrilaterals based on angle measurements and side lengths.

Student-facing Learning Goals

- Let's sort quadrilaterals.

Lesson Purpose

The purpose of this lesson is for students to sort quadrilaterals and begin to notice the hierarchy and subcategories of quadrilaterals.

In grade 3, students understand that different shapes may share attributes. They learn that shapes with four sides are part of a larger category of shapes, called quadrilaterals. In grade 4, students classify two-dimensional shapes by attributes, such as angle sizes, and the presence of perpendicular or parallel lines containing the sides.

In this lesson, students sort quadrilaterals into categories in a way that makes sense to them, with an emphasis on side lengths, angles, perpendicular sides, and parallel sides. Students may begin to notice some relationships between categories of quadrilaterals. For example, they might notice that squares have 4 right angles like rectangles and their opposite sides are parallel like parallelograms. These relationships will be brought out more fully in the next several lessons. Students should have access to straight edges, protractors, and patty paper throughout this lesson.

Access for:

Students with Disabilities

- Representation (Activity 1)

Instructional Routines

MLR2 Collect and Display (Activity 1), What Do You Know About _____? (Warm-up)

Materials to Gather

- Dry erase markers: Activity 1
- Sheet protectors: Activity 1

Materials to Copy

- Guess Which One (groups of 2): Activity 1
- Card Sort Quadrilaterals (Grade 5) (groups of 2): Activity 2

Required Preparation

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

In the next lesson, students consider subcategories within the hierarchy of quadrilaterals. Did students discuss subcategories or a hierarchy during today's lesson? What questions can you ask tomorrow to encourage students to think about a hierarchy?

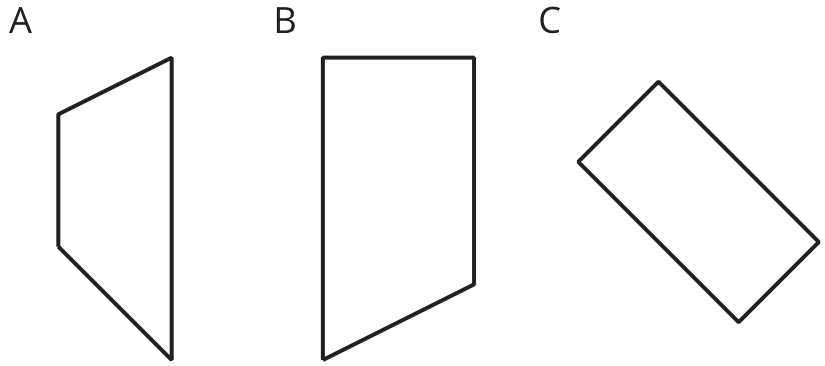
Cool-down (to be completed at the end of the lesson)

5 min

Choose Two

Student-facing Task Statement

1. Choose two of the quadrilaterals. What are they called?



2. Name an attribute the two quadrilaterals share.

   What is one way the two shapes are different?

Student Responses

1. A: trapezoid, B: trapezoid or right trapezoid, C: rectangle, parallelogram, or trapezoid (based on one of the definitions of trapezoid that is inclusive of parallelograms)
2. A and B: Both are trapezoids. Only B has right angles.
   B and C: Both are quadrilaterals that have at least one pair of opposite sides that are parallel and at least one angle that is 90 degrees. However, they are different because C has all angles that are 90 degrees. C also has two pairs of opposite sides that have equal measure.
   A and C: Both are quadrilaterals that have at least one pair of opposite sides that are parallel. C has two pairs of opposite sides parallel. C has all four angles that are 90 degrees whereas A has four angles that are all different measures.

Begin Lesson

Warm-up

10 min

What Do You Know About Quadrilaterals?

Standards Alignments

Building Towards 5.G.B.3

The purpose of this What Do You Know About _____ is for students to share what they know about and how they can represent quadrilaterals. In previous courses students have drawn and described squares, rectangles, and rhombuses and they will revisit and classify all of these shapes over the next several lessons.

Instructional Routines

What Do You Know About _____?

Student-facing Task Statement

What do you know about quadrilaterals?

Student Responses

- They have 4 sides.

Launch

- "What do you know about quadrilaterals?"
- 1 minute: quiet think time

- A square, rectangle, diamond, and trapezoid are examples of quadrilaterals.
- They can have opposite sides that are equal to each other or parallel.
- Some quadrilaterals have 90 degree angles.

Activity

- Record responses.

Synthesis

- “Draw some examples of quadrilaterals that you know.”
- Invite a few students to share their quadrilaterals with the rest of the class.
- “What is this shape called?” (a rectangle)
- “How else can we draw a rectangle?” (The sides can be longer or shorter.)

Activity 1

15 min

Guess Which One?

Standards Alignments

Addressing 5.G.B.3

The purpose of this activity is for students to use language to describe and distinguish quadrilaterals (MP6). The activity has the same structure as the activity where students tried to identify which rectangle on the coordinate grid their partner was thinking of. Students rely on what they remember about categories of quadrilaterals, such as rectangles and rhombuses. They can also use informal language such as tilted, arrow, or red pattern block. The goal of the synthesis is to share and gather language which was helpful for distinguishing the quadrilaterals.

This activity uses *MLR2 Collect and Display*. Advances: Conversing, Reading, Writing.

Access for Students with Disabilities

Representation: Internalize Comprehension. Activate or supply background knowledge. Provide a graphic organizer that lists characteristics of different quadrilaterals for students to use as a reference as they ask questions about the shape.
Supports accessibility for: Memory, Attention, Conceptual Processing

Instructional Routines

MLR2 Collect and Display

Materials to Gather

Dry erase markers, Sheet protectors

Materials to Copy

Guess Which One (groups of 2)

Required Preparation

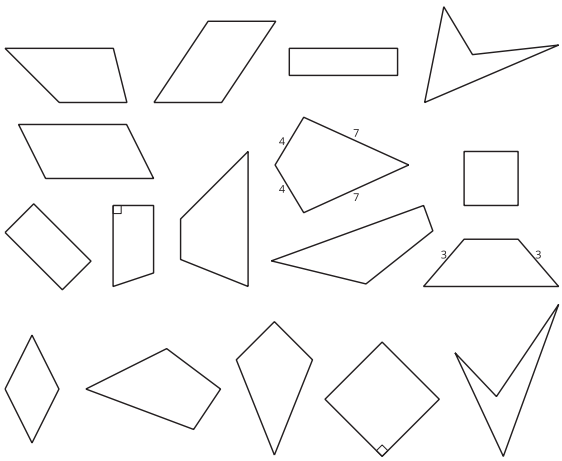
- Consider giving each student a sheet protector and a dry-erase marker so that students can easily reuse the Instructional master for multiple rounds of the game.

Student-facing Task Statement

1. Play a round of Guess Which One.

   Partner A: Select one of the quadrilaterals. Do not reveal your choice to your partner.

   Partner B: Ask “yes” or “no” questions to guess which shape your partner picked. After each question, cross out or remove quadrilaterals based on your partner’s answer.



   Use the space to record your questions for this round.

2. Han and Mai were playing Guess Which One. These are the last two shapes. What question can Mai ask to determine which shape is the one that Han picked?

Launch

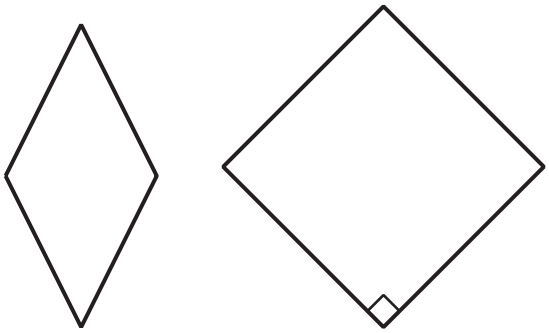
- Groups of 2
- Distribute the Instructional master with the sheet protectors and dry-erase marker to each group or instruct students to use the image of quadrilaterals in their workbook.

Activity

- 8 minutes: partner work time

MLR2 Collect and Display

- Circulate, listen for and collect the language students use to describe the quadrilaterals as they sort. Listen for:
  - language and gestures used to describe angles, such as: wide, open, skinny, square, big, small, obtuse, acute, right
  - language and gestures used to describe sides, such as: straight, cross, intersect, parallel, perpendicular
  - language used to describe shapes, such as: square, tilted, flat, trapezoid, rhombus, diamond, arrow, parallelogram
- Record students’ words and phrases on a visual display and update it throughout the



If there is time: Switch roles and play Guess Which One again.

Student Responses

1. Sample questions:
   a. Does your shape have a right angle?
   b. Is your shape a parallelogram?
   c. Does your shape have all sides with equal length?
   d. Does your shape have any parallel sides?
   e. Does your shape have any labeled side lengths?
2. Sample questions: Does your shape have 4 angles that measure 90 degrees? Is your shape called a square?

lesson.

Synthesis

- "Are there any other words or phrases that are important to include on our display?"
- As students share responses, update the display, by adding (or replacing) language, diagrams, or annotations.
- Remind students to borrow language from the display as needed.
- Invite previously selected students to share.
- Display rhombus card that is not a square.
- "What are some names we can use to describe this shape?" (quadrilateral, diamond, parallelogram, rhombus)

Advancing Student Thinking

If students do not ask specific questions during this task, collect a set of questions during a practice round and ask, "Which questions could you ask to find out which shape your partner chose?"

Activity 2

20 min

Card Sort: Quadrilaterals

Standards Alignments

Addressing 5.G.B.3, 5.G.B.4

The purpose of this activity is for students to sort quadrilaterals that they have worked with in previous grades. Students sort twice using categories of their own choosing and then again using parallel lines. Some categories students may choose include squares, rectangles, and rhombuses but they may also sort according to whether or not the shapes are labeled, how they are oriented, angle size, or side lengths (MP7).

As students work, encourage them to refine their descriptions of quadrilaterals using more precise language and mathematical terms (MP6).

Materials to Copy

Card Sort Quadrilaterals (Grade 5) (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.

1. Sort all of the quadrilateral cards in a way that makes sense to you. Name the categories in your sort.
2. Sort the quadrilateral cards in a different way and name each of the categories in your new sort.

Student Responses

Sample responses:

- shapes with parallel lines
- shapes with perpendicular sides or 90 degree angles
- categories of shapes: trapezoids, parallelograms, rectangles, squares
- shapes with obtuse or right or labeled angles

Launch

- Groups of 2
- Distribute a set of cards to each pair of students.

Activity

- “In this activity, you will sort some cards into categories of your choosing. When you sort the quadrilaterals, you should work with your partner to come up with categories.”
- 8 minutes: partner work time
- Select groups to share their categories and how they sorted their cards.
- Choose as many different types of categories as time allows.
- “Now work with your partner to sort your cards using parallel lines.”

- 5 minutes: partner work time

Synthesis

- Invite previously selected students to share.
- As students share their sorts, ask, “What attributes do all of these shapes have in common?”
- “How did you use parallel lines to sort the quadrilaterals?” (Some of the quadrilaterals did not have any parallel sides. Some had one pair of parallel sides. And some had two pairs of parallel sides.)
- Invite students to share examples of the quadrilaterals with no parallel sides, one pair of parallel sides, and two pairs of parallel sides.

Advancing Student Thinking

If a student does not know whether or not a shape has parallel lines, choose a shape that does have parallel lines and draw dashes to show what the lines would like if they were extended. Choose a shape that does not have parallel lines and prompt the students to draw dashes to extend the lines. Ask, “What is the same and different about the lines in these two shapes?”

Lesson Synthesis

10 min

“Today, we sorted quadrilaterals based on their attributes.”

As students respond to questions, create a large display to be revisited and edited throughout the next few lessons as students learn more about the relationships between different quadrilaterals.

“What are some categories of shapes that are quadrilaterals?” (rhombuses, squares, rectangles, trapezoids, parallelograms)

Draw the shapes as students name them or ask the students to draw the shapes.

“Pick two of the different shapes and share a way they are the same.” (Squares and rectangles have angles that are all 90 degrees. Rhombuses and squares have 4 sides of the same length.)

"Pick two of the different shapes and share a way they are different." (A trapezoid can have angles of any size while a square always has 90 degree angles. A trapezoid can have all different side lengths while a rhombus has 4 sides that are the same length.)

Keep this as an anchor chart to revisit for the next few lessons as students revise their thinking.

Suggested Centers

- Can You Draw It? (1–5), Stage 6: Shapes on the Coordinate Grid (Addressing)
- Which One? (K–5), Stage 6: Shapes on the Coordinate Grid (Addressing)
- How Are They the Same? (1–5), Stage 4: Grade 4 Shapes (Supporting)

Complete Cool-Down

Response to Student Thinking

The work in this lesson builds from the geometry concepts developed in a prior unit.

Prior Unit Support

Grade 3, Unit 7, Section A: Reason with Shapes

Lesson 5: Trapezoids

Standards Alignments

Addressing	5.G.B.4
Building Towards	5.G.B.3

Teacher-facing Learning Goals

- Compare different definitions for trapezoids, and use them to identify trapezoids.

Student-facing Learning Goals

- Let's explore trapezoids.

Lesson Purpose

The purpose of this lesson is for students to explore two different definitions of trapezoid.

The purpose of this lesson is for students to explore trapezoids and agree on a definition of trapezoids for this course. In the first activity, students see two different definitions for a trapezoid both of which are commonly used, one that excludes parallelograms and one that includes parallelograms. The exclusive definition of a trapezoid states that a trapezoid has exactly one pair of opposite sides that are parallel. The inclusive definition states that a trapezoid has at least one pair of opposite sides that are parallel. In the second activity, students recognize that we have chosen to use the inclusive definition of a trapezoid. Students should have access to straight edges, protractors, and patty paper throughout this lesson.

Access for:

Students with Disabilities

- Engagement (Activity 2)

English Learners

- MLR8 (Activity 2)

Instructional Routines

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

Lesson Timeline

Warm-up	10 min
Activity 1	20 min

Teacher Reflection Question

Did students notice the difference in the definitions of the trapezoid? How did they explain that difference in terms of the hierarchy on the anchor chart?

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

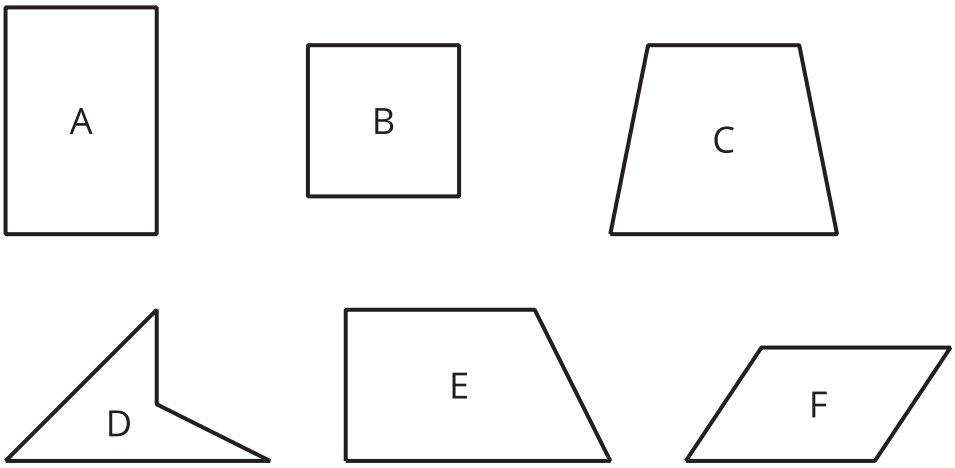
Which Ones are Trapezoids?

Standards Alignments

Addressing 5.G.B.4

Student-facing Task Statement

1. When is a quadrilateral also a trapezoid?
2. Which of the following shapes are trapezoids? Show or explain your reasoning.



Student Responses

1. A quadrilateral is a trapezoid if it has at least one pair of opposite sides that are parallel.
2. All of the shapes except D are trapezoids because they have at least one pair of opposite sides that are parallel.

Begin Lesson

Warm-up

10 min

What Do You Know About Trapezoids?

Standards Alignments

Building Towards 5.G.B.3

The purpose of this What Do You Know About Trapezoids is for students to share what they know about and how they can represent trapezoids.

Instructional Routines

What Do You Know About _____?

Student-facing Task Statement

What do you know about trapezoids?

Student Responses

- Trapezoids are quadrilaterals.
- The red pattern block is a trapezoid.
- They have one pair of parallel sides.
- I have heard someone call that shape a trapezoid. They have only one pair of parallel sides.

Launch

- "What do you know about trapezoids?"
- 1 minute: quiet think time

Activity

- Record responses.

Synthesis

- "Draw some examples of trapezoids."
- Invite a few students to share their trapezoids with the rest of the class.
- "How do you know these are trapezoids?" (They have one pair of parallel sides or they have at least one pair of parallel sides.)

Activity 1

20 min

What's a Trapezoid?

PLC Activity

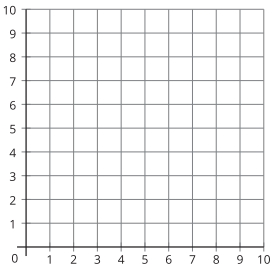
Standards Alignments

Addressing 5.G.B.4

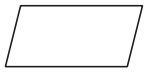
The purpose of this activity is for students to define a trapezoid and to explore two definitions for a trapezoid. The exclusive definition of a trapezoid states that a trapezoid has exactly one pair of opposite sides that are parallel. The inclusive definition states that a trapezoid has at least one pair of opposite sides that are parallel. Students choose whichever one makes sense to them and look at a parallelogram through the lens of that definition. In the synthesis, students see how the different definitions impact how a trapezoid fits into the hierarchy of quadrilaterals (MP7). This activity also gives students a chance to plot and label coordinates on the coordinate grid.

Student-facing Task Statement

1. Draw a trapezoid. Label the coordinates of the grid points you used.



2. Is it a square? Rectangle? Rhombus? Parallelogram? Explain your reasoning.
3. Describe a trapezoid in your own words. Compare your definition with a partner.
4. Is this shape a trapezoid according to your definition? Explain your reasoning.



Student Responses

1. Sample response:

Launch

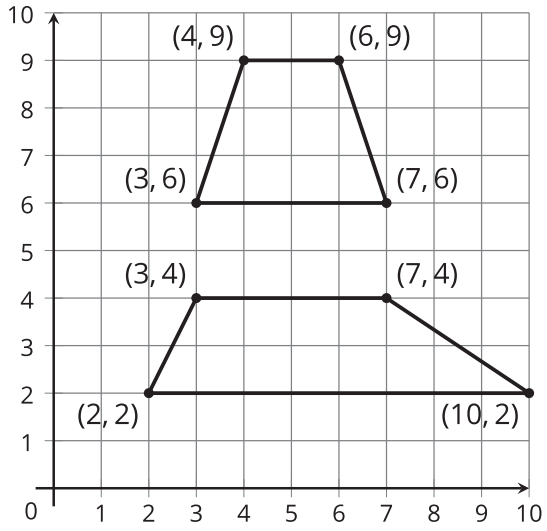
- Display:
  - "Some parallelograms are rectangles."
  - "All parallelograms are squares."
- "Is each statement true or false?" (I think that a parallelogram can be a rectangle but it does not have to be a square.)
- 1 minute: partner discussion

Activity

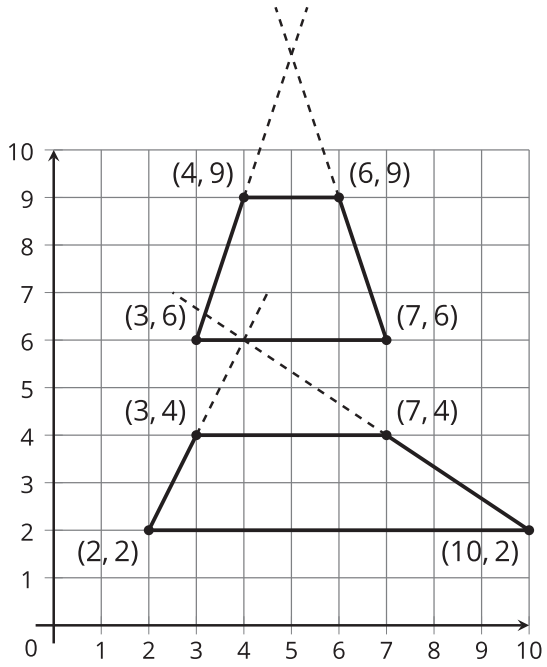
- Groups of 2
- 5 minutes: independent work time
- 5 minutes: partner work time
- Monitor for students who:
  - draw an isosceles trapezoid
  - draw a non-isosceles trapezoid

Synthesis

- Display: isosceles trapezoid and non-isosceles trapezoid from student solution or use student work
- "How are these two shapes the same? How are they different?" (They both have a pair



2. Sample response: My trapezoid is not a square or rhombus because the sides are different lengths. It is not a rectangle or parallelogram because one pair of opposite sides are not parallel. If the line segments are extended they will eventually meet.



3. Sample responses:
   - A trapezoid is a quadrilateral that has a pair of parallel sides.
   - A trapezoid is a quadrilateral that has only 1 pair of parallel sides (not 2).

of parallel sides. One has a pair of equal sides. The other one does not.)

- Display parallelogram from the last problem in student workbook and this text: "A trapezoid . . ."

". . . has exactly one pair of opposite sides parallel."	". . . has at least one pair of opposite sides parallel."

- "According to which definition is this shape a trapezoid? Why?" (the second definition because it has 2 pairs of parallel sides)
- "We'll continue to explore these two definitions further in the next activity."

4. Sample responses:
    - Yes, it is, because it has a pair of parallel sides.
    - No, it is not, because there are 2 pairs of parallel sides and it can only have 1.

Advancing Student Thinking

If a student does not recognize whether their trapezoid is a square, rectangle, or rhombus, co-create an anchor chart with examples and characteristics of these shapes.

Activity 2

15 min

Two Definitions of a Trapezoid

Standards Alignments

Addressing 5.G.B.4

The purpose of this activity is to further explore the two definitions of trapezoids and the hierarchy of quadrilaterals. Students evaluate different statements relating trapezoids and parallelograms deciding whether they are true or false with each definition. The activity synthesis establishes the convention for these materials that a trapezoid is a quadrilateral with at least one pair of parallel sides. As students discuss and justify their decisions, they reason clearly using the 2 definitions of trapezoid (MP6).

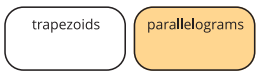
Access for English Learners

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

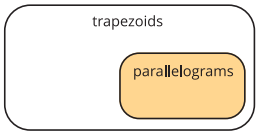
Access for Students with Disabilities

Engagement: Provide Access by Recruiting Interest. Synthesis: Optimize meaning and value. Invite students to share the meaning of a trapezoid and the similarities and differences in the two definitions of a trapezoid with a classmate who missed the lesson.
Supports accessibility for: Conceptual Processing; Language

Student-facing Task Statement



Definition 1
A trapezoid has exactly one pair of opposite sides that are parallel.



Definition 2
A trapezoid has at least one pair of opposite sides that are parallel.

Which statements go with the first definition? Which statements go with the second definition? Explain or show your reasoning.

1. All parallelograms are trapezoids.
2. No parallelograms are trapezoids.
3. All trapezoids are parallelograms.
4. Some trapezoids are parallelograms.
5. No trapezoids are parallelograms.

Student Responses

1. Second: A parallelogram has two pairs of opposite sides parallel which means a parallelogram is not a trapezoid according

Launch

- Groups of 2.
- Display 2 Venn diagrams for parallelograms and trapezoids.
- "What do you notice? What do you wonder?" (One diagram shows parallelograms are part of trapezoids and the other one shows there is no overlap.)
- 1 minute: partner discussion

Activity

- 5 minutes: independent work time
- 5 minutes: partner work time
- Monitor for students who:
  - can articulate the differences between the two definitions
  - draw examples of shapes to help evaluate each statement
  - accurately explain the difference between the two definitions

Synthesis

- Invite previously selected students to

to the first definition.

2. First: A parallelogram has two pairs of opposite sides parallel which means a parallelogram is not a trapezoid according to the first definition.
3. Neither: All parallelograms are trapezoids based on the second definition, but we can have a trapezoid with just one pair of parallel sides which means it is not a parallelogram.
4. Second: A trapezoid can be a parallelogram if it has two pairs of opposite sides parallel.
5. First: Since the definition says exactly one pair of parallel sides, then a trapezoid cannot be a parallelogram because parallelograms have two pairs of opposite parallel sides.

share.

- "Some people use the first definition of the trapezoid. We will be using the second definition."
- Display Venn diagrams from student workbook.
- "What does each diagram mean?" (Definition 2 shows that a parallelogram is a trapezoid but a trapezoid doesn't have to be a parallelogram. Definition 1 shows that trapezoids and parallelograms are distinct: a parallelogram can't be a trapezoid and a trapezoid can't be a parallelogram.)
- "Which diagram matches the definition of trapezoid we will use?" (The one on the right, Definition 2, because if a shape is a parallelogram it is also a trapezoid, but if a shape is a trapezoid, it doesn't have to be a parallelogram.)
- Consider asking students to draw:
    - A trapezoid that is also a parallelogram.
    - A trapezoid that is not a parallelogram.

Advancing Student Thinking

If students do not sort the statements correctly, suggest they sort the shape cards from an earlier lesson according to the two definitions. Then show them one statement at a time and ask, "Is this statement true of all the shapes in one of these groups?"

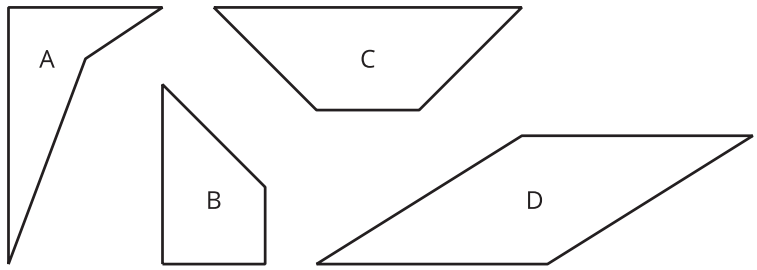
Lesson Synthesis

10 min

"Today we looked at 2 different definitions for a trapezoid."

"What do you know about trapezoids now?" (A trapezoid is a quadrilateral and has at least one pair of parallel sides. If a shape is a parallelogram, it is also a trapezoid.)

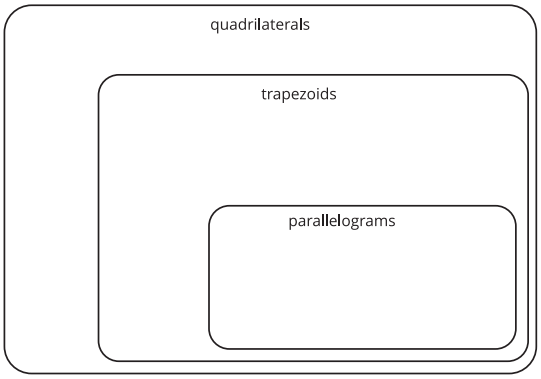
Draw or display shapes like these:



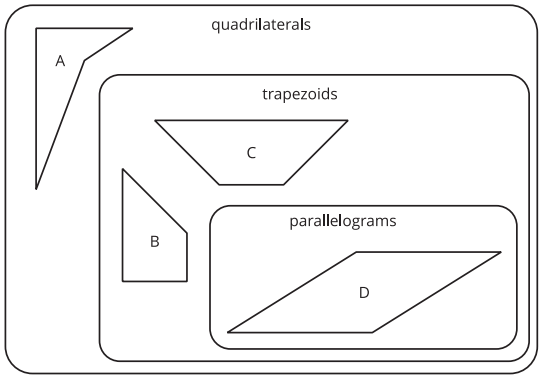
"Which of these shapes are trapezoids? How do you know?" (B, C, and D are trapezoids because they each have at least one pair of parallel sides.)

Display or draw a Venn diagram like the one below. Save the diagram to refer back to it in future lessons.

"Where would these shapes go in the diagram?"



Draw the shapes as students share.



Suggested Centers

- Can You Draw It? (1–5), Stage 6: Shapes on the Coordinate Grid (Addressing)
- Which One? (K–5), Stage 6: Shapes on the Coordinate Grid (Addressing)
- How Are They the Same? (1–5), Stage 4: Grade 4 Shapes (Supporting)

Complete Cool-Down

Response to Student Thinking

Students identify a figure that is not a trapezoid.

Next Day Support

- Before the warm up of the next lesson, place the shapes from the cool down of this lesson in the diagram used during the synthesis of this lesson.

The work in this lesson builds from the geometry concepts developed in a prior unit.

Prior Unit Support

Grade 4, Unit 8, Section B: Reason about Attributes to Solve Problems

Lesson 6: Hierarchy of Quadrilaterals

Standards Alignments

Addressing	5.G.B.3, 5.G.B.4
Building Towards	5.G.B.3

Teacher-facing Learning Goals

- Classify parallelograms in a hierarchy based on angle measurements and side lengths.
- Explain why a square is also a rhombus.

Student-facing Learning Goals

- Let's explore the hierarchy of quadrilaterals.

Lesson Purpose

The purpose of this lesson is for students to continue to build the hierarchy of quadrilaterals. Students use categories and subcategories to see that if a shape is a square it is also a rhombus and also a parallelogram.

The purpose of this lesson is for students to first relate squares and rhombuses and then relate rectangles and parallelograms. They see that if a shape is a square then it is also a rhombus and if a shape is a rectangle then it is also a parallelogram. But there are rhombuses that are not squares and there are parallelograms that are not rectangles. Students record these observations on the anchor chart from previous lessons. This gives students a chance to organize the quadrilaterals in a hierarchy and highlight the relationships they see between the properties of the shapes they worked with in this lesson. Students should have access to straight edges, protractors, and patty paper throughout this lesson.

When students define shapes and make explicit connections between shapes and categories, they reason abstractly and quantitatively (MP2).

Access for:

Students with Disabilities

- Representation (Activity 2)

Instructional Routines

MLR3 Clarify, Critique, Correct (Activity 2), Notice and Wonder (Warm-up)

Materials to Gather

- Toothpicks: Activity 1

Required Preparation

- Gather diagram from a previous lesson.

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 surprised you about student thinking in Activity 2?

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

5 min

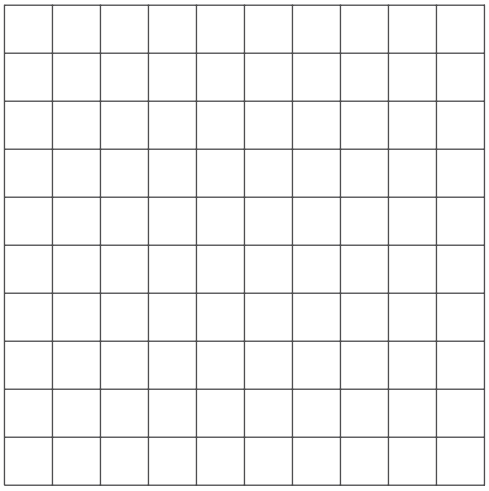
Rhombuses as Parallelograms

Standards Alignments

Addressing 5.G.B.3

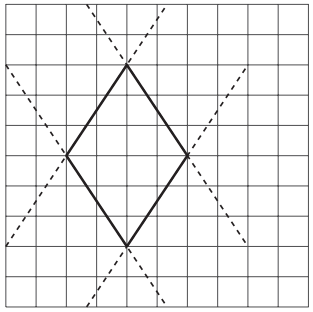
Student-facing Task Statement

Explain why a rhombus is always a parallelogram. Use the grid if it is helpful.



Student Responses

A rhombus is always a parallelogram because its opposite sides are parallel. If I draw a rhombus on a grid I can see that the opposite sides will never meet even if the lines are extended in both directions.



Begin Lesson

Warm-up

10 min

Notice and Wonder: Squares and Rhombuses

Standards Alignments

Building Towards 5.G.B.3

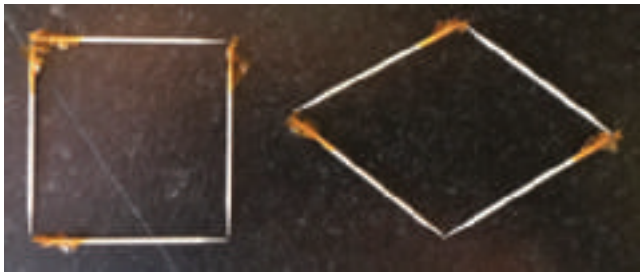
The purpose of this Notice and Wonder is to consider examples of some of the shapes that students will build and study in this lesson, namely squares and rhombuses. The key attributes students may notice in the shapes are the side lengths and the angles.

Instructional Routines

Notice and Wonder

Student-facing Task Statement

What do you notice? What do you wonder?



Student Responses

Students may notice:

- There are 2 shapes made out of toothpicks.
- The shape on the left is a square.
- The angles are different sizes.
- They are both made from 4 toothpicks.

Students may wonder:

- Are they the same shape?
- Can you make the shape on the right by squishing the shape on the left?
- What other polygons can be made with 4 toothpicks?
- What polygons can be made if we combine the toothpicks?

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 are these shapes the same? How are they different?" (They have the same side lengths, but the angle measurements are different. The square or the one on the left has all 90 degree angles, but the shape on the right does not have any 90 degree angles.)
- "What names can we use to describe each of the shapes?" (square, rectangle, rhombus, or parallelogram for the one on the left, and rhombus or parallelogram for the one on the right)

Activity 1

15 min

Shapes with Toothpicks

Standards Alignments

Addressing 5.G.B.3

The purpose of this activity is for students to notice that a square is a special kind of rhombus and that a rectangle is a special kind of parallelogram. Working with toothpicks, students construct quadrilaterals with the same side lengths but different angles. When the side lengths are all the same, the shapes are rhombuses since the defining property of rhombuses is having 4 equal sides. The only way to make a square with the toothpicks, however, is to make 4 right angles. Hence building quadrilaterals with 4 toothpicks helps students visualize why a square is always a rhombus but a rhombus is only sometimes a square. In the same way they see that a rectangle is always a parallelogram but a parallelogram is only sometimes a rectangle.

Materials to Gather

Toothpicks

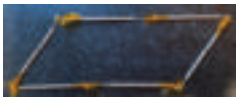
Required Preparation

- Each group of 2 needs 6 toothpicks.

Student-facing Task Statement

1. Build a square with your toothpicks. How do you know it is a square?
2. Use the same four toothpicks to build this shape. What stayed the same? What changed?

3. Build a rectangle with six toothpicks. How do you know it is a rectangle?
4. Use the same six toothpicks to build this shape. What stayed the same? What changed?



Student Responses

1. Sample response:

Launch

- Groups of 2

Activity

- 5 minutes: independent work time.
- 5 minutes: partner work time
- Monitor for students who:
  - explain that the square and rhombus have the same side lengths, but different angles
  - explain that the rectangle and parallelogram have the same side lengths, but different angles

Synthesis

- Ask previously selected students to share their thinking.
- “Which of the shapes you made are parallelograms? How do you know?” (They are all parallelograms. The opposite sides are parallel in all of these shapes.)
- “Which of the shapes you built have 4 equal

I know this is a square because the size of the toothpicks are the same so the side lengths are the same and the angles are all 90 degrees.

2. The length of the sides stay the same. The angles between the sides change.
3.

I know this is a rectangle because the four angles are right angles.

4. The side lengths stayed the same, but the angles changed.

sides?" (The first two, the ones using 4 toothpicks.)

- Display: rhombus
- "A quadrilateral with 4 equal sides is a rhombus."

Activity 2

20 min

Three Quadrilaterals

Standards Alignments

Addressing 5.G.B.3, 5.G.B.4

The purpose of this activity is for students to determine if quadrilaterals are squares, rhombuses, rectangles, or parallelograms. Then they begin to outline the relationships between these different types of quadrilaterals, leading to the overall hierarchy of quadrilateral types which students investigate more fully in the next lesson.

When students draw quadrilaterals belonging or not belonging to different categories they reason abstractly and quantitively (MP2), using the definitions of the shapes to inform their drawings.

This activity uses *MLR3 Clarify, Critique, and Correct.* Advances: Reading, Writing, Representing.

Access for English Learners

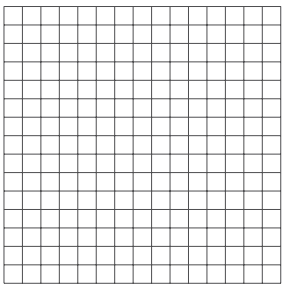
Representation: Develop Language and Symbols. Synthesis: Represent the problem in multiple ways to support understanding of the situation. For example, use a video or pattern blocks to show the connections between the quadrilaterals.
Supports accessibility for: Conceptual Processing, Visual-Spatial Processing

Instructional Routines

MLR3 Clarify, Critique, Correct

Student-facing Task Statement

1. Draw 3 different quadrilaterals on the grid, making sure at least one of them is a parallelogram.



2. For each of your quadrilaterals determine if it is a:
   - square
   - rhombus
   - rectangle
   - parallelogram

   Explain or show your reasoning.
3. Draw a rhombus that is not a square. Explain or show how you know it is a rhombus but not a square.
4. Draw a rhombus that is a square. Explain or show how you know it is a rhombus and a square.
5. Diego says that it is impossible to draw a

Launch

- Groups of 2

Activity

- 5 minutes: independent work time
- 5 minutes: partner work time

Synthesis

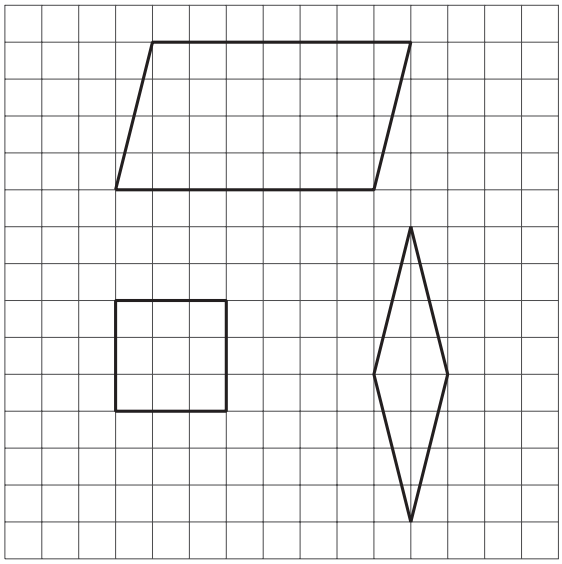
MLR3 Clarify, Critique, Correct

- Display the following partially correct answer and explanation:
- "Mai says: All squares are rhombuses. If a shape is a square, it is also a rhombus. Rhombuses are not squares."
- Read the explanation aloud.
- "What do you think Mai means? Is anything unclear?"
- 1 minute: quiet think time
- 2 minutes: partner discussion
- "With your partner, work together to write a revised explanation."
- Display and review the following criteria:
  - Specific words and phrases: all, some

square that is not a rhombus. Do you agree with him? Explain or show your reasoning.

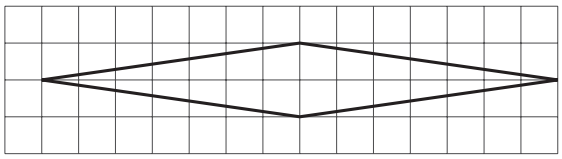
Student Responses

1. Sample response:



2. Sample response: The top shape is a parallelogram because the opposite sides are parallel. If each of the line segments is extended the opposite sides won't ever touch which means they are parallel. The shape on the bottom left is a parallelogram and a square. The angles are at intersecting gridlines and form 90 degrees and each side is 3 units. The shape is also a rhombus because the sides are equal. The shape on the bottom right is a rhombus because the 4 sides have the same length. It is also a parallelogram because opposite sides are parallel.

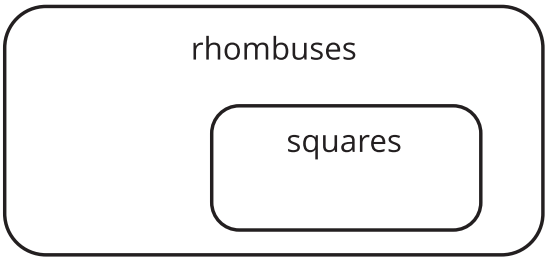
3. Samples response:



This shape is a rhombus because all of the sides go through 7 units horizontally and one unit vertically. Or if we fold the paper in

- Labeled table/graph/diagram

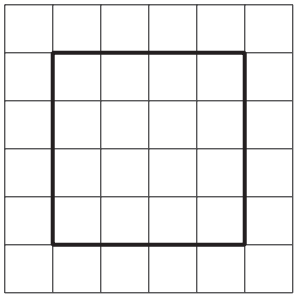
- 3–5 minutes: partner work time
- Select 1–2 groups to share their revised explanation with the class. Record responses as students share.
- "What is the same and different about the explanations?" (They all explain why a rhombus does not have to be a square.)
- Display or draw a diagram like this:



- "How can we use this diagram to help us revise Mai's thinking?" (The diagram shows that all squares are rhombuses but not all rhombuses are squares.)

half vertically and horizontally, the lines will all match up. If we reflect the shape vertically and horizontally we can see that the line segments are equal. It is not a square because the angles are not 90 degrees.

4. Sample response:



This shape is a rhombus because all sides are 4 units long. It is a square because it has 4 right angles.

5. Yes, Diego is correct. A square has to have 4 equal sides and that means it's a rhombus.

Lesson Synthesis

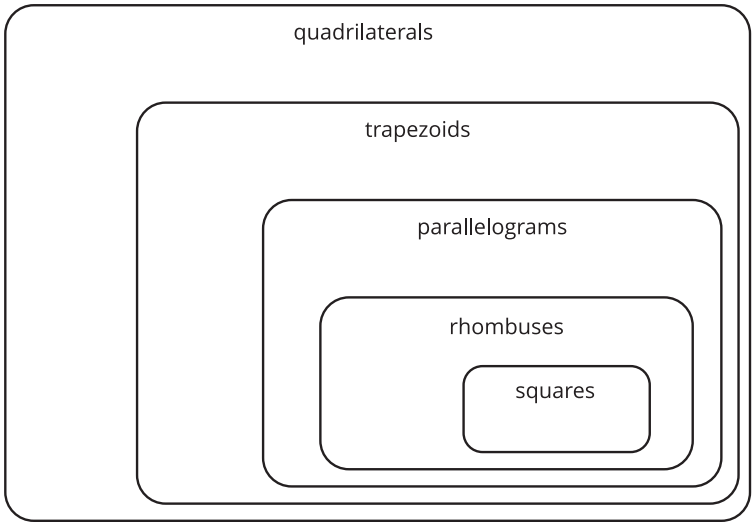
10 min

"Today we related squares to rhombuses and rectangles to parallelograms."

"What makes a square a rhombus?" (It has 4 equal sides.)

"Are all rhombuses squares?" (No, there are rhombuses that have no right angles and they are not squares.)

Display or draw a diagram like this or use the diagram from a previous lesson.



"Where would we draw a rhombus that is not a square?" (In the rhombus box, but not the square box.)

"How does this diagram show that a square is a rhombus and a parallelogram?" (It shows the squares inside the rhombuses that are inside the parallelograms, which means that a shape that is a square is also a rhombus and a parallelogram.)

Suggested Centers

- Which One? (K–5), Stage 7: Grade 5 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 5: Grade 5 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 4: Grade 4 Shapes (Supporting)

Complete Cool-Down

Response to Student Thinking

Student's explanation does not mention parallel lines.

Next Day Support

- After the warm-up in the next lesson, pair students up to discuss their responses.

The work in this lesson builds from the geometry concepts developed in a prior unit.

Prior Unit Support

Grade 4, Unit 8, Section B: Reason about Attributes to Solve Problems

Lesson 7: Rectangles and Squares

Standards Alignments

Addressing	5.G.B.3, 5.G.B.4
Building Towards	5.G.B.3

Teacher-facing Learning Goals

- Explain why a square is also a rectangle.

Student-facing Learning Goals

- Let's learn more about rectangles and squares.

Lesson Purpose

The purpose of this lesson is for students to understand that a square is also a rectangle.

The purpose of this lesson is to establish a hierarchy of quadrilaterals based on properties of angles and side lengths and to represent that hierarchy using a diagram. Students examine the relationships between different pairs of quadrilaterals, notably squares and rectangles but also squares and rhombuses, and trapezoids and parallelograms. They have worked with explicit examples of these shapes in previous lessons and described their defining attributes. In this lesson they put all of these relationships together to understand relationships between categories (MP7), such as:

- A quadrilateral that is both a rectangle and a rhombus is a square.
- Rhombuses, squares, and rectangles are all parallelograms, but parallelograms don't have to be rhombuses, rectangles, or squares.

Students should have access to straight edges, protractors, and patty paper throughout this lesson.

Access for:

Students with Disabilities

- Action and Expression (Activity 2)

English Learners

- MLR8 (Activity 1)

Instructional Routines

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

Materials to Copy

- Quadrilateral Clues (groups of 2): 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

As students shared their ideas today, how did you ensure all students' voices were heard and valued as an important part of the collective learning?

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

5 min

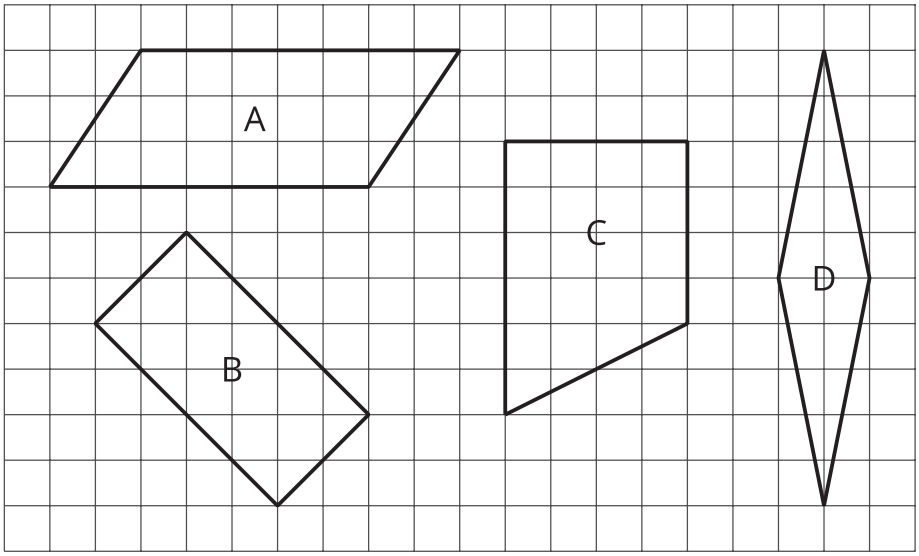
Quadrilaterals in the Venn Diagram

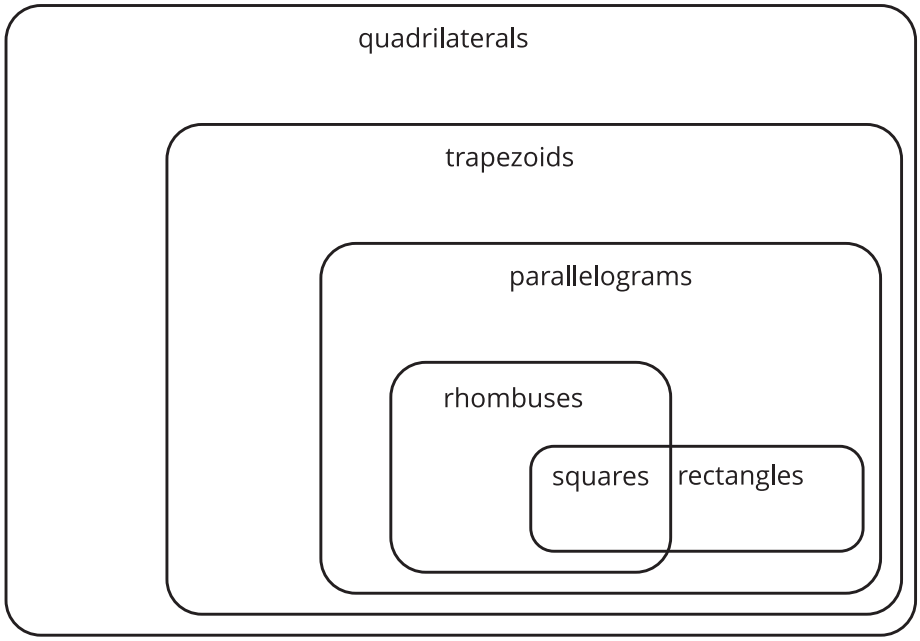
Standards Alignments

Addressing 5.G.B.4

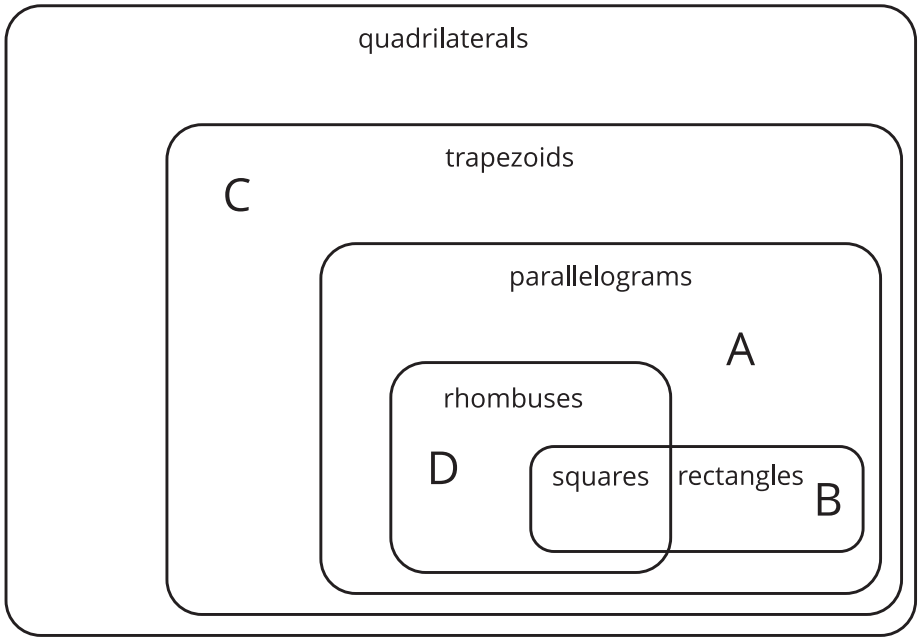
Student-facing Task Statement

Draw the shape or write the letter for each shape in the correct location on the diagram:





Student Responses



Begin Lesson

Warm-up

10 min

What Do You Know About This Shape?

Standards Alignments

Building Towards 5.G.B.3

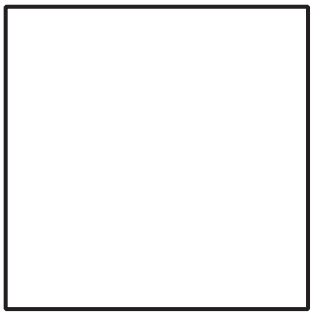
The purpose of this What Do You Know About...? is for students to share what they know about a square. Students revisit this same question in the lesson synthesis.

Instructional Routines

What Do You Know About _____?

Student-facing Task Statement

What do you know about this shape?



Student Responses

- It's a square.
- There are 4 sides that are all equal.
- All of the angles measure 90 degrees. Or all angles are right angles.
- The opposite sides are parallel to each other.

Launch

- Display the image.
- "What do you know about this shape?"
- 1 minute: quiet think time

Activity

- Record responses.

Synthesis

- "What is this shape called?" (a square)
- "How do you know it is a square?" (It has 4 equal sides and 4 angles that are 90 degrees.)
- "We are going to come back to this question in the lesson synthesis."

Activity 1

15 min

Quadrilateral Clues

Standards Alignments

Addressing 5.G.B.3, 5.G.B.4

In this activity, students deepen their understanding of the quadrilateral hierarchy. Students recognize quadrilaterals with specific attributes. Students consider the defining attributes of each type of quadrilateral as they decide whether or not certain shapes exist. For example, a square which is not a rectangle does not exist because a square has 4 right angles (and 4 equal sides). However, there are rectangles that are not squares because the 4 sides of a rectangle do not need to have the same length.

As students work on these problems, monitor for those who experiment and try to draw shapes with different attributes and for those who think about the defining attributes of each shape category.

Access for English Learners

MLR8 Discussion Supports. Students should take turns finding a match and explaining their reasoning to their partner. Display the following sentence frames for all to see: "I noticed _____ , so I matched . . ." Encourage students to challenge each other when they disagree.
Advances: Conversing, Representing

Materials to Copy

Quadrilateral Clues (groups of 2)

Required Preparation

- Create a set of cards from the Instructional master for each group
- of 2. Gather diagram from a previous lesson.

Student-facing Task Statement

Spread out your shape cards so you and your partner can see all of them.

Work together to find a shape that fits each clue. If you don't think it is possible to find that shape, explain why. You can only use each shape one time.

1. Find a quadrilateral that is not a parallelogram.

Launch

- Groups of 2
- Give each group of 2 a set of cards.

Activity

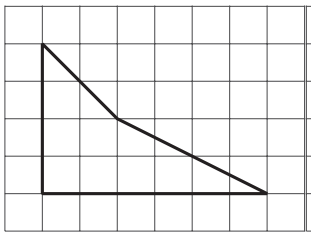
- 2 minutes: independent think time
- 5 minutes: partner work time
- Monitor for statements about properties of shapes and conjectures such as:

2. Find a rhombus that is also a square.
3. Find a rhombus that is not a square.
4. Find a trapezoid that is not a rectangle.
5. Find a rectangle that is not a square.
6. Find a parallelogram that is not a rectangle.
7. Find a square that is not a rectangle.

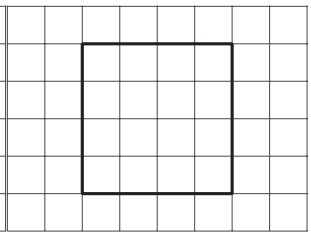
Student Responses

Sample responses:

1.



2.



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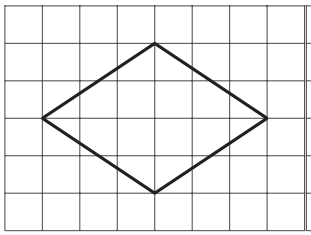
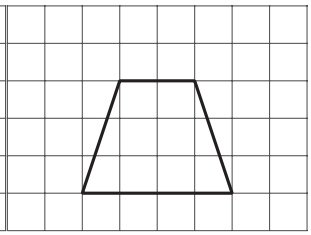


4.



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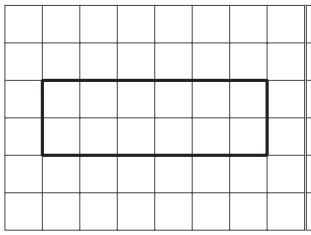
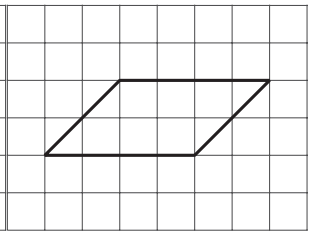


6.

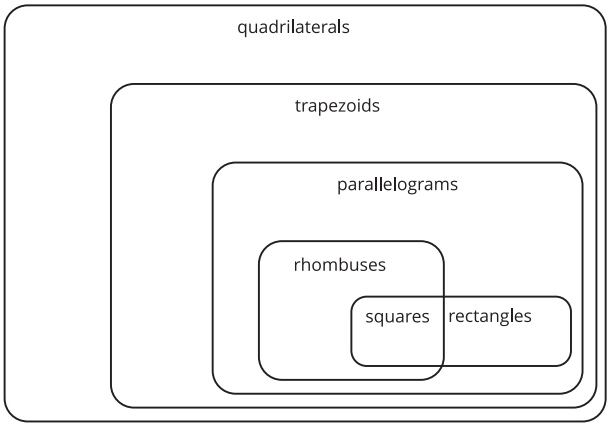


7. This is impossible because all squares have four right angles.

- a rhombus has 4 equal sides
- squares are rhombuses
- a trapezoid can be a rectangle because it has at least one pair of parallel sides
- a rectangle is a parallelogram because it has two pairs of parallel sides
- it is impossible to find a square that isn't a rectangle

Synthesis

- Invite previously selected students to share.
- "Clare says, 'Some rhombuses are squares and some rectangles are squares.' Do you agree with her?"(Yes, we saw with the toothpicks that a rhombus can be a square but it doesn't have to be. Rectangles are squares when the 4 sides are equal, but the 4 sides don't need to be equal, so not all rectangles are squares.)
- Display or draw a diagram like the one below or use the diagram from a previous lesson and ask, "How does the diagram show the relationship between rhombuses and rectangles?" (It shows that squares are both rhombuses and rectangles.)



- "Are all squares rectangles? How does the diagram show this?" (Yes, a square has 4

right angles and the diagram shows that squares sit inside of rectangles.)

Activity 2

20 min

Always, Sometimes, Never

Standards Alignments

Addressing 5.G.B.3, 5.G.B.4

The purpose of this activity is for students to use their understanding of the hierarchy of quadrilaterals to determine if statements relating shape categories are sometimes, always, or never true. Students may draw examples of the shapes to help them answer the questions or they may think of defining attributes. The synthesis gives students an opportunity to have a discussion about these statements and apply what they have learned to make sense of the hierarchy as it is represented in a diagram. For example, as seen in the previous activity, squares are included inside rectangles on the diagram because all squares are rectangles.

Access for Students with Disabilities

Action and Expression: Develop Expression and Communication. Provide access to a variety of tools: colored pencils, markers, etc. Invite students to use the tools in order to help organize the anchor chart to aid in completing the task accurately.
Supports accessibility for: Conceptual Processing, Attention

Student-facing Task Statement

Write always, sometimes, or never in each blank to make the statements true.

For each statement that is completed with "sometimes," draw a figure for which the statement is true and another figure for which the statement is not true.

1. A rhombus is _____ a square.

Launch

- Groups of 2

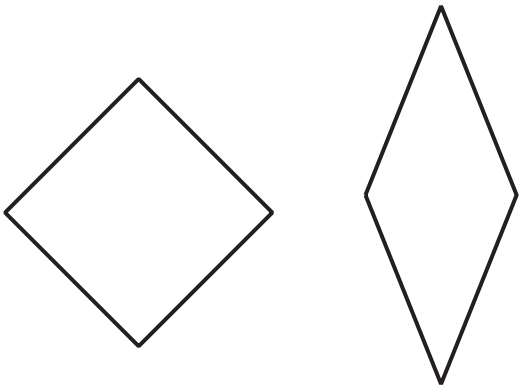
Activity

- 5 minutes: independent work time
- 5 minutes: partner work time
- Monitor for students who:
  - make drawings of shapes to help answer each question

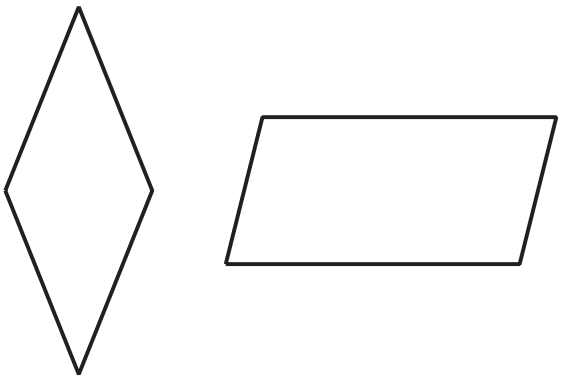
2. A square is _____ a rhombus.
3. A triangle is _____ a quadrilateral.
4. A square is _____ a rectangle.
5. A rectangle is _____ a parallelogram.
6. A parallelogram is _____ a rhombus.
7. A trapezoid is _____ a parallelogram.

Student Responses

1. A rhombus is sometimes a square.



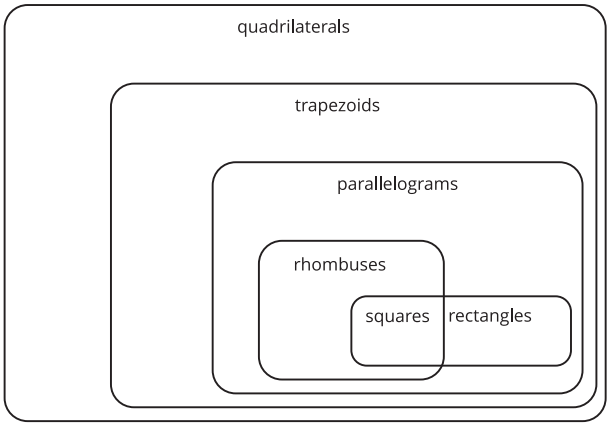
2. A square is always a rhombus.
3. A triangle is never a quadrilateral.
4. A square is always a rectangle.
5. A rectangle is always a parallelogram.
6. A parallelogram is sometimes a rhombus.



- think about defining properties of the different shapes

Synthesis

- "Is it possible to have a rhombus that is also a square? How do you know?" (Yes. I drew one. Any square has 4 equal sides so it is also a rhombus.)
- Display the diagram from the synthesis of the previous activity.



- "How does the diagram show that a rhombus is sometimes a square?" (A part of the rhombus bubble includes squares.)
- "How does the diagram show how parallelograms are related to trapezoids?" (It shows that a parallelogram is always a trapezoid but there are trapezoids that are not parallelograms.)

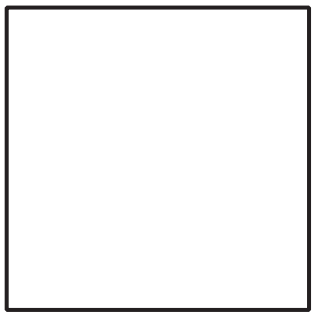
7. A trapezoid is sometimes a parallelogram.

Lesson Synthesis

10 min

"Today we looked at relationships between different types of quadrilaterals including trapezoids, parallelograms, rectangles, rhombuses, and squares."

Display the image from the warm-up:



"During the warm-up we said the shape is a square because _____ (include statements students made earlier in the warm up). What do you now know about this shape?" (This is a square, but it also is a rectangle. It can also be called a rhombus or parallelogram.)

"Why is a square also a rhombus?" (All of its sides are the same length.)

"Why is a square also a rectangle?" (All of the angles are 90 degrees.)

"If a shape is a rectangle, is it also a square?" (Sometimes. It depends on the lengths of the sides of the rectangle. If all four sides are equal then it is a square, but if all four sides are not equal then it is not a square.)

"If a shape is a rectangle and a rhombus, is it also a square?" (Yes, because it has 4 right angles and 4 equal sides.)

Suggested Centers

- Which One? (K–5), Stage 7: Grade 5 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 5: Grade 5 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 4: Grade 4 Shapes (Supporting)

Complete Cool-Down

Response to Student Thinking

Students incorrectly place figures in the diagram.

Next Day Support

- Before the next lesson, review a correct solution to the cool down from this lesson.

The work in this lesson builds from the geometry concepts developed in a prior unit.

Prior Unit Support

Grade 4, Unit 8, Section A: Side Lengths, Angles, and Lines of Symmetry

Lesson 8: Sort Triangles

Standards Alignments

Addressing 5.G.B, 5.G.B.3, 5.G.B.4

Teacher-facing Learning Goals

- Classify triangles based on angle measurements and side lengths.

Student-facing Learning Goals

- Let's sort triangles.

Lesson Purpose

The purpose of this lesson is for students to classify triangles using angle measures and side lengths.

The purpose of this lesson is to sort triangles into categories, recognizing right triangles as a category. Students also examine side lengths and notice that sometimes all 3 side lengths are different, sometimes 2 side lengths are equal, and sometimes all 3 side lengths are equal. Students identify right triangles and examine the possible angles that a triangle can have. For example, there are triangles with 3 acute angles but a triangle can only have one right or obtuse angle. Students should have access to straight edges, protractors, and patty paper throughout this lesson.

This lesson has a Student Section Summary.

Access for:

Students with Disabilities

- Engagement (Activity 1)

English Learners

- MLR7 (Activity 2)

Instructional Routines

Estimation Exploration (Warm-up)

Materials to Copy

- Card Sort Triangles (Grade 5) (groups of 2): Activity 1

Lesson Timeline

Warm-up	10 min

Teacher Reflection Question

How are students applying what they learned about the hierarchy of quadrilaterals to help

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

them make sense of classifying triangles?

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

5 min

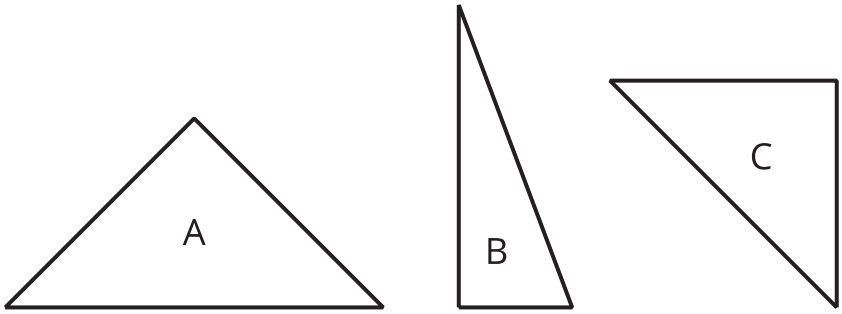
All, Some, None of the Triangles

Standards Alignments

Addressing 5.G.B.4

Student-facing Task Statement

Complete the statements about the triangles below.



1. All of the triangles _____.
2. Some of the triangles _____.
3. None of the triangles _____.

Student Responses

1. All of the triangles have a right angle or an angle that measures 90 degrees. All of the triangles have a horizontal side.
2. Some of the triangles have two sides that are the same. Some of the triangles have a vertical side.
3. None of the triangles have an angle greater than 90 degrees. None of the triangles have all 3 side lengths the same.

Begin Lesson

Warm-up

10 min

Estimation Exploration: Angle Measure

Standards Alignments

Addressing 5.G.B

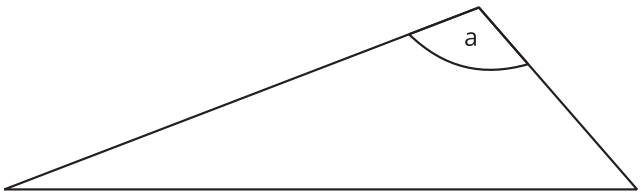
This warm-up prompts students to estimate the measure of an angle in a triangle. This will be important as they classify triangles in this lesson so will need to distinguish acute, right, and obtuse angles. They will not need to measure angles explicitly but recalling angle measure will help them distinguish the different types of triangles.

Instructional Routines

Estimation Exploration

Student-facing Task Statement

What is the measure of the angle?



Record an estimate that is:

too low	about right	too high

Student Responses

Sample responses:

too low	about right	too high
90	100 to 120	150

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

- “How do we know the angle is more than 90 degrees?” (90 degrees is a right angle and this angle is obtuse. It's more than a right angle.)
- “How do we know the angle is less than 180 degrees?” (180 degrees is a straight line and this bends inward so it’s less than 180 degrees.)

Activity 1

20 min

The Right Fit

Standards Alignments

Addressing 5.G.B.4

The purpose of this activity is to sort triangles according to their angle measures and side lengths. When they finish sorting, students will notice that two of the possible categories will not have any matching triangles, namely if all 3 sides of a triangle have the same length then the triangle will not have a right angle or an obtuse angle. Students think about whether or not such a triangle could exist and present informal arguments to explain their reasoning (MP3). The activity synthesis formally introduces the category of right triangles.

Access for Students with Disabilities

Engagement: Internalize Self-Regulation. Provide students an opportunity to self-assess and reflect on their own progress. For example, ask students to compare grids and discuss whether or not their choices for whether a triangle fits a certain criteria are the same and why.
Supports accessibility for: Language, Social-Emotional Functioning

Materials to Copy

Card Sort Triangles (Grade 5) (groups of 2)

Required Preparation

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

Student-facing Task Statement

1. Find a triangle card that fits in each space on the grid.
2. If you don't think it is possible to find a triangle that fits certain criteria, explain why not.

Launch

- Groups of 2
- Give each pair of students a set of triangle cards from the Instructional master.

Activity

- 5 minutes: independent work time
- 5 minutes: partner work time

	all three side lengths are different	exactly two of the side lengths are the same	all three side lengths are the same
has a 90 degree angle			
has an angle that is greater than 90 degrees			
all three angles are less than 90 degrees			

Explanations:

Student Responses

Sample responses:

	all three side lengths are different	exactly two of the side lengths are the same	all three side lengths are the same
has a 90 degree angle	A, C, E, H, G	F	
has an angle that is greater than 90 degrees	B, D, L	I	
all three angles are less than 90 degrees	M	K	J

I don't think three side lengths the same with a 90 degree angle is possible because the third side in a right triangle is always longer than the other two sides. I don't think it is possible with

Synthesis

- Display a set of triangle cards and a blank table from the workbook. Place the cards in the correct location in the table as you discuss the questions in the synthesis.
- "How did you determine which triangles have 90 degree angles?" (I used the corner of a sheet of paper, measured it using a protractor, or used the grids.)
- "Triangles with a 90 degree angle are called **right triangles**."
- "How can we be certain that a triangle is a right triangle?" (We can measure the angles or use the grid.)
- Display shape F.
- "What do you notice about the angles of this triangle?" (One is a 90 degree angle and the other two are equal to each other. The other two are half of a 90 degree angle.)
- "What do you notice about the sides of this triangle?" (Two of them are the same length.)

an angle greater than 90 degrees either because the side opposite that angle will be longer than the other sides.

Advancing Student Thinking

If a student needs an entry point into the task, cover the criteria listed in the top row of the table prompt them to find triangles that fit in the criteria listed in the first column. Then, reveal one criteria at a time from the top view and ask, “Which triangle also fits this description?”

Activity 2

15 min

All, Some, None

Standards Alignments

Addressing 5.G.B.3

The purpose of this activity is for students to sort triangles in a way that makes sense to them and then make observations about right triangles. Students make statements about the right triangle shape cards using the quantifiers all, some, or none. The main shape characteristics students will likely use in their statements are the angle measures, particularly for the two angles that are not right angles, and the side lengths. Students might also choose other characteristics like the orientation of the triangles.

This activity uses *MLR7 Compare and Connect*. Advances: Representing, Conversing.

Required Preparation

- Gather materials from previous activity:
  - Triangle Cards

Student-facing Task Statement

1. Sort the triangle cards from the previous activity in a way that makes sense to you. Describe how you sorted the cards.

Launch

- Groups of 2 or 4 (if doing a gallery walk)

2. Now sort out the triangles with a 90 degree angle. For these triangles, write statements about each category.

- All of the triangles with a 90 degree angle...
- Some of the triangles with a 90 degree angle...
- None of the triangles with a 90 degree angle...

Student Responses

Sample responses:

1.
    - triangles with a right angle and triangles without a right angle
    - triangles with an angle measuring more than 90 degrees and triangles with no angle measuring more than 90 degrees
    - triangles with no equal sides, two equal sides (but not three), and three equal sides
2. All of the triangles with a 90 degree angle
    - only have one 90 degree angle
    - have two other angles that are smaller than 90 degrees
    - don't have any angles that are larger than 90 degrees

    Some of the triangles with a 90 degree angle
    - have two side lengths that are the same
    - have no side lengths that are the same

    None of the triangles with a 90 degree angle
    - have any angles larger than 90 degrees
    - have three side lengths that are the same length

Activity

- 5 minutes: independent work time
- 5 minutes: small-group work time

MLR7 Compare and Connect

- "Create a visual display that shows your thinking about the problems. You may want to include details such as notes, diagrams, or drawings to help others understand your thinking."
- 2–5 minutes: independent or group work
- 5–7 minutes: gallery walk

Synthesis

- Invite students to share how they sorted the cards, including
    - triangles with a right angle
    - triangles with an obtuse angle
    - triangles with acute angles
    - triangles with no sides equal
    - triangles with 2 or more sides equal
- "How did you know which triangle cards have right triangles?" (I used the grid lines. I measured with a protractor. I used the corner of a card.)
- Invite students to share their responses for properties all of the right triangles share.
- Record their responses.

Lesson Synthesis

10 min

"Today we sorted and classified triangles."

"What are some different ways you can sort triangles?" (We can sort them by angle size and side lengths. We can look for a right angle. We can look for 2 or 3 sides that are the same length.)

"How is classifying triangles the same as classifying quadrilaterals?" (We looked at side lengths and angles in both cases. Right angles were important for both and so were equal side lengths.)

"How is classifying triangles different from classifying quadrilaterals?" (There are fewer sides for triangles and so there are not as many possibilities. A triangle can only have one right angle while a quadrilateral can have as many as 4.)

Suggested Centers

- Which One? (K–5), Stage 7: Grade 5 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 5: Grade 5 Shapes (Addressing)
- How Are They the Same? (1–5), Stage 4: Grade 4 Shapes (Supporting)

Student Section Summary

In this section we sorted and analyzed different kinds of quadrilaterals and triangles. We described their properties. For example:

- A rectangle is a quadrilateral with 4 right angles.
- A rhombus is a quadrilateral with 4 equal sides.
- A square is a quadrilateral with 4 right angles and 4 equal sides.

We also described how the shapes are related to each other. For example, we can see that a square is always a rhombus because it has the properties of a rhombus. A square is also always a rectangle because it has the properties of a rectangle. On the other hand, a rectangle does not need to be a square because its side lengths don't have to all be the same. And a rhombus does not need to be a square because its angles do not have to be right angles.

Complete Cool-Down

Response to Student Thinking

The work in this lesson builds from the geometry concepts developed in a prior unit.

Prior Unit Support

Grade 4, Unit 8, Section A: Side Lengths, Angles, and Lines of Symmetry

Section C: Numerical Patterns

Lesson 9: Generate Patterns

Standards Alignments

Addressing	5.OA.B.3
Building Towards	5.OA.B.3

Teacher-facing Learning Goals

- Given two rules, generate two numerical patterns. Identify apparent relationships between corresponding terms in the two patterns.

Student-facing Learning Goals

- Let's explore rules and patterns.

Lesson Purpose

The purpose of this lesson is for students to generate patterns, given two rules, and identify relationships between corresponding terms in the different patterns.

The purpose of this lesson is for students to generate two different numerical patterns and then compare the terms in the two patterns. In this lesson, the patterns are the multiples of given whole numbers, starting with 0, and one of the numbers is a multiple of the other. This means that one of the patterns is contained inside the other. For example, the list of multiples of 9 is contained inside the list of multiples of 3 since every third multiple of 3 is a multiple of 9. Students express relationships within a pattern and between 2 patterns using multiplication and division.

Access for:

Students with Disabilities

- Action and Expression (Activity 1)

Instructional Routines

Choral Count (Warm-up), MLR2 Collect and Display (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

In what ways did you accept students' everyday way of talking as a starting point for joining the math conversation today?

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

5 min

Patterns and Relationships

Standards Alignments

Addressing 5.OA.B.3

Student-facing Task Statement

1. List the first 10 numbers for these 2 patterns.

   Jada's rule: Start with 0 and keep adding 5.

   Priya's rule: Start with 0 and keep adding 10.

2. What number will be in Priya's pattern when Jada's pattern has 100?
3. What relationship do you notice between corresponding numbers in the two patterns?

Student Responses

1. 0, 5, 10, 15, 20, 25, 30, 35, 40, 45

   0, 10, 20, 30, 40, 50, 60, 70, 80, 90
2. 200

3. Sample response: Priya’s numbers are double Jada’s numbers or Jada's numbers are half Priya's numbers.

Begin Lesson

Warm-up

10 min

Choral Count: Two Patterns

Standards Alignments

Building Towards 5.OA.B.3

The purpose of this Choral Count is to invite students to notice patterns and relationships in two different counts. These understandings help students develop fluency with multiples and will be helpful when students identify relationships between corresponding terms in two patterns in the next several lessons.

Instructional Routines

Choral Count

Student Responses

0	0
6	12
12	24
18	36
24	48
30	60
36	72
42	84
48	96
54	108
60	120

Launch

- “Count by 6, starting at 0.”
- Record as students count.
- Stop counting and recording at 60.

Activity

- “What patterns do you see?”
- 1–2 minutes: quiet think time
- Record responses.
- “Now count by 12s, starting at 0.”
- Record as students count.
- Stop counting and recording at 120.

- "What patterns do you see?"
- 1–2 minutes: quiet think time
- Record responses.

Synthesis

- "If we continue counting, what numbers will be in both counts?" (All of the numbers on the second list, the ones where we count by 12)

Activity 1

20 min

What's the Pattern?

Standards Alignments

Addressing 5.OA.B.3

The purpose of this activity is for students to generate two different patterns, given two different rules, and recognize relationships between corresponding terms (MP7). Students may notice a variety of relationships between the two patterns and may describe them generally (all of the numbers in one pattern are contained in the other pattern) or more specifically (the numbers of the second pattern are every other number from the first pattern). To answer the questions about corresponding terms in the patterns, students may continue the patterns or may use the relationship between the patterns. The number 192 is deliberately chosen to encourage using the relationship between the patterns.

When students find and explain patterns related to the rules and relationships, they look for and express regularity in repeated reasoning (MP8).

This activity uses *MLR2 Collect and Display*. Advances: Conversing, Reading, Writing.

Access for Students with Disabilities

Action and Expression: Internalize Executive Functions. Synthesis: Invite students to plan a strategy, including the tools they will use, for identifying apparent relationships between corresponding terms in patterns. If time allows, invite students to share their plan with a partner before they begin.
Supports accessibility for: Conceptual Processing, Memory

Instructional Routines

MLR2 Collect and Display

Student-facing Task Statement

1. Jada and Priya create patterns using rules. Use each rule to complete their patterns.

   Jada's rule: start with 0 and keep adding 4.

   Priya's rule: start with 0 and keep adding 8.

2. If Jada and Priya continue their patterns, what number will be in Priya's pattern when Jada's pattern has:

   a. 40
   b. 60

3. If Jada and Priya continue their patterns, what number will be in Jada's pattern when Priya's pattern has 192?
4. What relationships do you notice between the numbers in Priya's pattern and the numbers in Jada's pattern?

Student Responses

1. 0, 4, 8, 12, 16, 20, 24, 28, 32, 36

   0, 8, 16, 24, 32, 40, 48, 56, 64, 72
2. Sample response:
   a. 80 because $36 + 4 = 40$ and $72 + 8 = 80$.
   b. 120 because $2 \times 60 = 120$.
3. 96 because $192 \div 2 = 96$.
4. Sample responses: Priya's numbers are double Jada's numbers. Jada's numbers are half of Priya's numbers. All of Priya's

Launch

- Groups of 2

Activity

- 1–2 minutes: quiet think time
- 10–12 minutes: partner work time

MLR2 Collect and Display

- Circulate, listen for and collect the language students use to describe the relationships between Jada's and Priya's rules. Listen for: double, half of, twice as much, times 2, divided by 2.
- Record students' words and phrases on a visual display and update it throughout the lesson. Monitor for students who notice that:
  - all of Priya's numbers are in Jada's pattern, but not all of Jada's numbers are in Priya's pattern
  - each of Priya's numbers is double the corresponding number in Jada's pattern
  - each of Jada's numbers is half the corresponding number in Priya's pattern

Synthesis

- "Are there any other words or phrases that are important to include on our display?"
- As students share responses, update the display, by adding (or replacing) language, diagrams, or annotations.
- Remind students to borrow language from the display as needed.

numbers are in Jada's pattern.

- "Are all of Priya's numbers in Jada's pattern? How do you know?" (Yes. There are 2 fours in 8 so each of Priya's numbers appears twice as far out in Jada's list.)
- "What relationships do you see between Jada's pattern and Priya's pattern?" (Each number in Priya's pattern is double the corresponding number in Jada's pattern. Each number in Jada's pattern is half the corresponding number in Priya's pattern.)

Advancing Student Thinking

If students are not able to identify a relationship between the two different patterns, ask:

- "What is the same about the numbers in the patterns?"
- "What is different about the numbers in the patterns?"

Activity 2

15 min

More Patterns

Standards Alignments

Addressing 5.OA.B.3

The purpose of this activity is for students to practice generating two different patterns from two different rules and observe and quantify relationships between corresponding terms. Both sets of rules generate patterns that have the same relationships between corresponding terms. Each of Priya's terms is 3 times greater than each of Jada's corresponding terms and each of Jada's terms is $\frac{1}{3}$ of Priya's corresponding terms.

When students find and explain patterns related rules and relationships, they look for and express regularity in repeated reasoning (MP8).

Student-facing Task Statement

Partner A

1. Use each rule to create a pattern.

   Jada's rule: Start at 0. Keep adding 2.

   Priya's rule: Start at 0. Keep adding 6.

2. If the patterns continue:

   a. What number will be in Priya's pattern when Jada's pattern has 34? Explain or show your reasoning.

   b. What number will be in Jada's pattern when Priya's pattern has 120? Explain or show your reasoning.

3. What relationships do you notice between the numbers in Priya's pattern and the numbers in Jada's pattern?

   Partner B

4. Use each rule to create a pattern.

   Jada's rule: Start at 0. Keep adding 3.

   Priya's rule: Start at 0. Keep adding 9.

5. If the patterns continue,

   a. What number will be in Priya's pattern when Jada's pattern has 54? Explain or show your reasoning.

   b. What number will be in Jada's pattern when Priya's pattern has 198? Explain or show your reasoning.

6. What relationships do you notice between

Launch

- Groups of 2
- "You and your partner will each complete some problems about patterns independently. After you're done, discuss your work with your partner."

Activity

- 5 minutes: independent work time
- 3 minutes: partner discussion
- "Look back at your work and make any revisions based on what you learned from discussing with your partner."
- 1–2 minutes: independent work time
- Monitor for students who:
  - revise their thinking based on partner discussion
  - use multiplication expressions to represent the relationships between the patterns

Synthesis

- Ask previously identified students to share their thinking.
- Display completed patterns from both sets of rules.
- "How are the patterns from the pairs of rules the same? How are they different?" (Some of the numbers are in all four patterns. Some numbers aren't in any pattern like 5 and 11. In both sets of rules, Priya's numbers are 3 times greater than Jada's numbers and Jada's numbers are $\frac{1}{3}$ Priya's numbers.)
- "How would you describe the relationship between Priya's pattern and Jada's pattern?" (Priya's numbers are all 3 times as much as Jada's corresponding numbers.)
- "What can I multiply the numbers in Priya's

the numbers in Priya's pattern and the numbers in Jada's pattern?

Student Responses

1. 0, 2, 4, 6, 8, 10, 12, 14, 16, 18

   0, 6, 12, 18, 24, 30, 36, 42, 48, 54
2. a. 102 since it is 3 times as much as Jada's number
   b. 40 since it's $\frac{1}{3}$ as much as Priya's number
3. All of the numbers in Priya's pattern are in Jada's pattern. Some of the numbers in Jada's pattern are in Priya's pattern. Each number in Priya's pattern is 3 times the corresponding number in Jada's pattern. Each number in Jada's pattern is $\frac{1}{3}$ the corresponding number in Priya's pattern.
4. 0, 3, 6, 9, 12, 15, 18, 21, 24, 27

   0, 9, 18, 27, 36, 45, 54, 63, 72, 81
5. a. 162 since it's 3 times as much as Jada's number
   b. 66 since it's $\frac{1}{3}$ as much as Priya's number
6. All of the numbers in Priya's pattern are in Jada's pattern. Some of the numbers in Jada's pattern are in Priya's pattern. Each number in Priya's pattern is 3 times the corresponding number in Jada's pattern. Each number in Jada's pattern is $\frac{1}{3}$ the corresponding number in Priya's pattern.

pattern by to get the corresponding numbers in Jada's pattern?" ($\frac{1}{3}$, each number in Jada's pattern is $\frac{1}{3}$ the corresponding number in Priya's pattern.)

Lesson Synthesis

10 min

"Today we generated patterns and recognized relationships between two different patterns."

Display or rewrite the numbers from the 2 choral counts in the warm-up.

"What relationships do you notice between the patterns in the counts?" (Each number in the second count is twice the matching number in the first count. Each number in the first count is one half the matching number in the second count. All the numbers on the second list are also on the first list. The second list is every other number of the first list.)

"Explain to your partner why these relationships will continue if the patterns continue." (The second pattern adds 12 each time and that's twice what the first pattern adds each time.)

Suggested Centers

- Can You Draw It? (1–5), Stage 7: Grade 5 Shapes (Addressing)
- Picture Books (K–5), Stage 3: Find Shapes (Addressing)
- Can You Draw It? (1–5), Stage 4: Area and Perimeter (Supporting)

Complete Cool-Down

Response to Student Thinking

The work in this lesson builds from the pattern concepts developed in a prior unit.

Prior Unit Support

Grade 4, Unit 6, Section A: Features of Patterns

Lesson 10: Interpret Relationships

Standards Alignments

Addressing	5.OA.B.3
Building Towards	5.OA.B.3

Teacher-facing Learning Goals

- Given rules, generate two numerical patterns. Identify and explain more complex relationships between corresponding terms.

Student-facing Learning Goals

- Let's find relationships between patterns.

Lesson Purpose

The purpose of this lesson is for students to generate patterns based on two given rules and then identify and explain more complex relationships.

In this lesson students continue to generate two patterns and observe relationships between their corresponding terms. Most of the relationships are more complex in this lesson, involving either multiplication by a fractional amount or both multiplication and addition or subtraction. Students begin to express the relationships between patterns using equations (MP2).

Access for:

Students with Disabilities

- Representation (Activity 2)

Instructional Routines

MLR7 Compare and Connect (Activity 1), True or False (Warm-up)

Lesson Timeline

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

Teacher Reflection Question

How effective were your questions in supporting students' thinking today? What did students say or do that showed they were effective?

Cool-down	5 min

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

5 min

Jada's and Priya's Patterns

Standards Alignments

Addressing 5.OA.B.3

Student-facing Task Statement

1. Jada and Priya are creating rules for patterns. Follow each rule to complete the patterns.

   Jada's rule: start with 0 and add 3.

   Priya's rule: start with 0 and add 4.

2. Kiran says that when Jada's number is 45, Priya's corresponding number will be 90. Do you agree? Why or why not?

Student Responses

1. 0, 3, 6, 9, 12, 15, 18, 21, 24, 27

   0, 4, 8, 12, 16, 20, 24, 28, 32, 36
2. No. Sample response: I don't agree because 90 is not a multiple of 4 so it's not on Priya's list.

Begin Lesson

Warm-up

10 min

True or False: Multiply and Divide

Standards Alignments

Building Towards 5.OA.B.3

The purpose of this True or False is for students to demonstrate understandings they have for the relationship between multiplication and division. Students will use this understanding in the lesson when they recognize multiplicative relationships between patterns.

Instructional Routines

True or False

Student-facing Task Statement

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

- $276 \div 3 = \frac{1}{3} \times 276$
- $276 \div 3 = \frac{276}{6}$
- $(276 \div 3) \times 2 = \frac{2}{3} \times 276$

Student Responses

- True: $276 \div 3 = \frac{276}{3} = \frac{1}{3} \times 276$
- False: It's 276 thirds not sixths.
- True: I just multiplied the right hand side of the first equation by 2.

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 problem.

Synthesis

- "How can the relationship between multiplication and division help you justify your reasoning?" (I used the fact that dividing by 3 is the same as multiplying by $\frac{1}{3}$.)

Activity 1

20 min

Mix and Match: 3 Patterns

Standards Alignments

Addressing 5.OA.B.3

The purpose of this activity is for students to practice interpreting relationships between patterns generated from two different rules. Students may need to generate patterns beyond the boxes provided. Encourage them to continue the pattern as needed. Students may describe the patterns and relationships in different, but accurate ways. Encourage them to notice as many relationships as they can and describe the relationships in whatever way makes sense to them. This is the first time students see two patterns where the numbers in one pattern are not multiples of the numbers in the other pattern.

This activity uses *MLR7 Compare and Connect*. Advances: Representing, Conversing.

Instructional Routines

MLR7 Compare and Connect

Student-facing Task Statement

1. Complete the patterns for each set of rules.
2. What are some relationships between the patterns for each set of rules? Be prepared to explain your thinking.

Set A

Rule 1: Start at 0. Keep adding 3.

Rule 2: Start at 0. Keep adding 6.

Set B

Rule 1: Start at 4. Keep adding 3.

Rule 2: Start at 9. Keep adding 6.

Set C

Rule 1: Start at 0. Keep adding 5.

Rule 2: Start at 0. Keep adding 3.

Launch

- Groups of 2

Activity

- 5 minutes: independent work time
- 2 minutes: partner discussion

MLR7 Compare and Connect

- "Create a visual display that shows your thinking about the relationships between each set of patterns. Include details such as notes, diagrams, and drawings to help others understand your thinking."
- 2–5 minutes: independent or group work
- 3–5 minutes: gallery walk

Synthesis

- "What is the same and what is different in the way we represented the relationships between the patterns?" (Some of us used numbers and symbols, some of us wrote sentences.)
- 30 seconds: quiet think time
- 1 minute: partner discussion

Student Responses

1. Set A:

   0, 3, 6, 9, 12

   0, 6, 12, 18, 24

   Set B:

   4, 7, 10, 13, 16

   9, 15, 21, 27, 33

   Set C:

   0, 5, 10, 15, 20

   0, 3, 6, 9, 12

2. Sample responses:
   Set A: Each number with rule 2 is double the corresponding number with rule 1. Each number with rule 1 is half the corresponding number with rule 2.

   Set B: Each number with rule 2 is 1 more than double the corresponding number with rule 1. Each number with rule 1 is half of the corresponding number with rule 2 minus $\frac{1}{2}$.

   Set C: The difference between the numbers in rule 1 and the corresponding numbers in rule 2 goes up by 2 each time. Each number in rule 1 is the number in rule 2 multiplied by $1\frac{2}{3}$.

- "What is the same and what is different about Set A and Set B?" (They both add the same amount, but one set starts at 0. Set B has a lot more odd numbers in it. In set A, each number in rule 2 is double the number in rule 1, but in set B, each number in rule 2 is 1 more than double the number in rule 1.)
- "For which pair of rules was it most challenging to notice and describe relationships?" (Set B because there was no multiple that worked to get from one pattern to the other. Set C because there weren't doubles or halves.)

Activity 2

15 min

Generate Patterns

Standards Alignments

Addressing 5.OA.B.3

The purpose of this activity is for students to interpret more complex relationships in corresponding terms from patterns generated from two different rules. Both sets of rules generate patterns that have the same relationships between corresponding terms. Each of the terms in rule 2 is $\frac{3}{2}$ times greater than each of the corresponding terms in rule 1 and each of the terms in rule 1 is $\frac{2}{3}$ the corresponding term in rule 2. Some students may state these relationships in different ways. The relationships between these patterns build directly on the third pair of rules from the previous activity where the terms for rule 1 were $\frac{5}{3}$ the corresponding terms in rule 2.

Access for Students with Disabilities

Representation: Internalize Comprehension. Synthesis: Use multiple examples and non-examples to emphasize the relationship between corresponding terms in patterns.
Supports accessibility for: Attention, Memory, Conceptual Processing

Student-facing Task Statement

Partner A

1. Generate patterns for the two rules.

   Rule 1: Start with 0. Keep adding 4.

   Rule 2: Start with 0. Keep adding 6.

2. Compare your patterns. What relationships do you notice?
3. What number will be in pattern 2 when the number in the pattern 1 box is 40?
4. What number will be in pattern 1 when the number in the pattern 2 box is 120?

Partner B

Launch

- Groups of 2
- "You and your partner will each complete some problems about patterns independently. After you're done, discuss your work with your partner."

Activity

- 5–7 minutes: independent work time
- 3–5 minutes: partner discussion
- "Look back at your work and make any revisions based on what you learned from your discussion."
- 1–2 minutes: independent work time
- Monitor for students who:
  - recognize that each term in pattern 2 is $1\frac{1}{2}$ times the corresponding term in pattern 1

1. Generate patterns for the two rules.

   Rule 1: Start with 0. Keep adding 2.

   Rule 2: Start with 0. Keep adding 3.

2. Compare your patterns. What relationships do you notice?
3. What number will be in pattern 2 when the number in the pattern 1 box is 30?
4. What number will be in pattern 1 when the number in the pattern 2 box is 60?

Student Responses

Partner A

1. 0, 4, 8, 12, 16, 20, 24, 28, 32, 36

   0, 6, 12, 18, 24, 30, 36, 42, 48, 54
2. Sample responses: Some of the same numbers are in both patterns, each number in pattern 2 will be $1\frac{1}{2}$ times greater than the corresponding number in pattern 1. Each number in pattern 1 is $\frac{2}{3}$ the corresponding number in pattern 2.
3. When 40 is the number for rule 1, 60 is the corresponding number for rule 2.
4. When 120 is the number for rule 2, 80 is the corresponding number for rule 1.

Partner B

1. 0, 2, 4, 6, 8, 10, 12, 14, 16, 18

   0, 3, 6, 9, 12, 15, 18, 21, 24, 27
2. Sample responses: Some of the same numbers are in both patterns, each number in pattern 2 will be $1\frac{1}{2}$ times greater than the corresponding number in pattern 1. Each number in pattern 1 is $\frac{2}{3}$ the
   - recognize that each term in pattern 1 is $\frac{2}{3}$ the corresponding term in pattern 2

Synthesis

- Ask previously selected students to share their thinking.
- Display or write the numbers in the patterns for partner A.
- "How can we represent the relationship between the numbers in the patterns with multiplication equations?" (Each number in rule 2 is $\frac{3}{2}$ the corresponding number in rule 1. Each number in rule 1 is $\frac{2}{3}$ the corresponding number in rule 2: $6 = \frac{3}{2} \times 4$, $4 = \frac{2}{3} \times 6$.)
- Display or write the numbers in the patterns for partner B.
- "How can we represent the relationships between the numbers in the patterns with multiplication equations?" ($3 = 1\frac{1}{2} \times 2$, $2 = \frac{2}{3} \times 3$.)

corresponding number in pattern 2.

3. When 30 is the number in rule 1, 45 is the corresponding number in rule 2.
4. When 60 is the number in rule 2, 40 is the corresponding number in rule 1.

Lesson Synthesis

10 min

"Today we noticed and explained relationships between patterns. Some of the relationships involved fractions."

"What relationships did you find between the patterns we studied today?" (Sometimes I could multiply each term in one pattern by the same number to get the corresponding number in the other pattern. Sometimes that number was a fraction.)

Consider asking students to record their response in a math journal and then share their response with a partner.

Suggested Centers

- Can You Draw It? (1–5), Stage 7: Grade 5 Shapes (Addressing)
- Picture Books (K–5), Stage 3: Find Shapes (Addressing)
- Can You Draw It? (1–5), Stage 4: Area and Perimeter (Supporting)

Complete Cool-Down

Response to Student Thinking

Students do not recognize that the number 90 will not be in the pattern.

Next Day Support

- During the synthesis of first activity in the next lesson, ask students to identify numbers that would not be part of the patterns described in the activity.

Lesson 11: Patterns and Ordered Pairs

Standards Alignments

Addressing	5.OA.B.3
Building Towards	5.G.A.1

Teacher-facing Learning Goals

- Form ordered pairs consisting of corresponding terms from two patterns and graph the ordered pairs on a coordinate grid.

Student-facing Learning Goals

- Let's graph patterns on the coordinate grid.

Lesson Purpose

The purpose of this lesson is for students to represent corresponding terms in two patterns on the coordinate grid.

The purpose of this lesson is to continue to analyze the relationship between two patterns by plotting corresponding numbers on the coordinate grid. After generating patterns in previous lessons, students now make ordered pairs from those numbers and plot them on the coordinate grid. They observe patterns and interpret the meaning of points on the coordinate grid in terms of generating rules.

Access for:

Students with Disabilities

- Action and Expression (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Notice and Wonder (Warm-up)

Lesson Timeline

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

Teacher Reflection Question

What strategy did most students use in their work today?

Cool-down	5 min

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

5 min

2 Rules

Standards Alignments

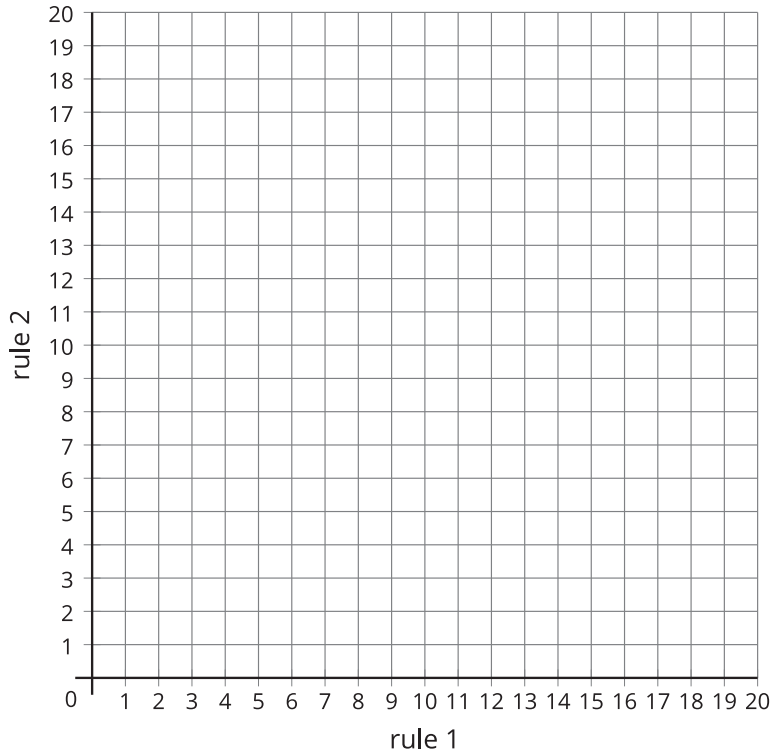
Addressing 5.OA.B.3

Student-facing Task Statement

1. Complete the patterns for each rule.

	A	B	C	D
Rule 1: Start at 0. Add 3.				
Rule 2: Start at 0. Add 6.				

2. What relationships do you notice between corresponding terms in the two patterns?
3. Plot and label the points on the coordinate grid.



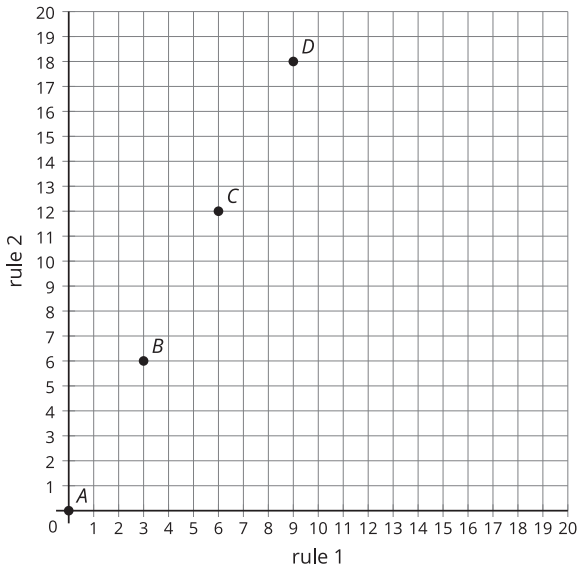
Student Responses

1.

	A	B	C	D
Rule 1: Start at 0. Add 3.	0	3	6	9
Rule 2: Start at 0. Add 6.	0	6	12	18

2. The numbers with rule 2 are twice as large as the corresponding numbers with rule 1. The numbers with rule 1 are $\frac{1}{2}$ the corresponding numbers with rule 2.

3.



Begin Lesson

Warm-up

10 min

Notice and Wonder: The Coordinate Grid

Standards Alignments

Building Towards 5.G.A.1

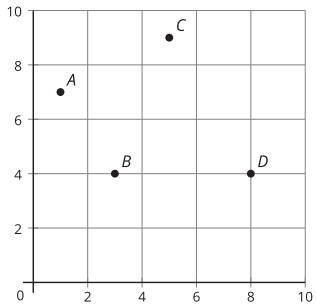
The purpose of this warm-up is for students to discuss the patterns they see in points plotted on a coordinate grid, which will be useful when students graph ordered pairs consisting of corresponding terms from two patterns in a later activity. While students may notice and wonder many things about this image, the location of the points and their coordinates are the important discussion points.

Instructional Routines

Notice and Wonder

Student-facing Task Statement

What do you notice? What do you wonder?



Student Responses

Students may notice:

- The points are scattered.
- There are 4 points labeled A–D.
- Points B and D are on the same horizontal line.
- The numbers on the vertical and horizontal axis skip count by two.
- Some points are not on the vertices of the grid.

Students may wonder:

- What do the points represent?
- Can we connect the points?
- If we connect the points, what shape will it make?

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 can we use coordinates to describe the location of each point?" (The point D is at $(8, 4)$ since its horizontal coordinate is 8 and its vertical coordinate is 4. The other points are harder to tell though the vertical coordinate of B is 4.)

Activity 1

20 min

Patterns on the Coordinate Grid, Part 1

Standards Alignments

Addressing 5.OA.B.3

The purpose of this activity is for students to generate two patterns from rules and then graph them on the coordinate grid. Students first identify a point on the coordinate grid with one of the pairs of numbers from the patterns and then plot the rest of the points. Students may notice that the points on the graph are regularly spaced. They are invited to share this and other observations in the synthesis.

Access for English Learners

MLR8 Discussion Supports. Display sentence frames to support partner discussion: "First, I _____ because . . ." and "I noticed _____ so I . . . ."
Advances: Speaking, Writing, Conversing, Representing

Access for Students with Disabilities

Action and Expression: Develop Expression and Communication. Synthesis: Develop fluency with connecting rules, tables, and a coordinate grid to the same pattern. Provide access to blank or partially completed tables.
Supports accessibility for: Conceptual Processing, Attention

Student-facing Task Statement

Partner A

Rule 1: Start at 0. Keep adding 8.

Rule 2: Start at 0. Keep adding 2.

1. Use the rules to complete the table.

	A	B	C	D	E	F
rule 1						
rule 2						

2. Which table column represents the point on the coordinate grid? Label the point with the appropriate letter.

Launch

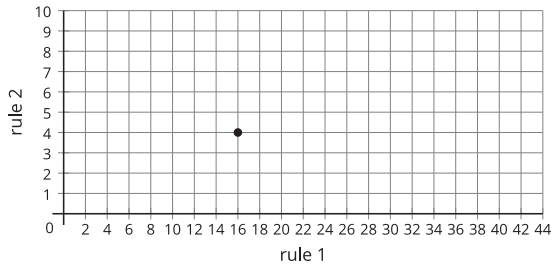
- Groups of 2
- "You and your partner will each start some problems about patterns and the coordinate grid independently. After a couple minutes, work with your partner to complete the problems."

Activity

- 2 minutes: independent time
- 5 minutes: partner work time

Synthesis

- "How did you decide where to place the points on the grid?" (I used the top row to decide how far over to go on the horizontal axis and the second rule to decide how far up to go on the vertical axis.)
- Invite students to share completed graphs for parts A and B.



3. Plot and label the rest of the points.

Partner B

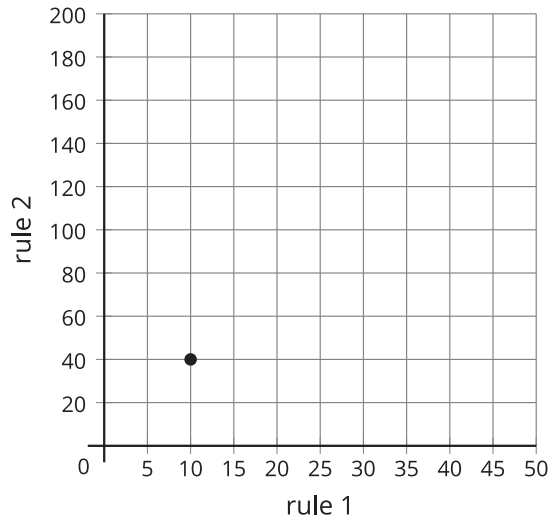
Rule 1: Start at 0. Keep adding 10.

Rule 2: Start at 0. Keep adding 40.

1. Use the rules to complete the table.

	A	B	C	D	E	F
rule 1						
rule 2						

2. Which table column represents the point on the coordinate grid? Label the point with the appropriate letter.



3. Plot and label the rest of the points.

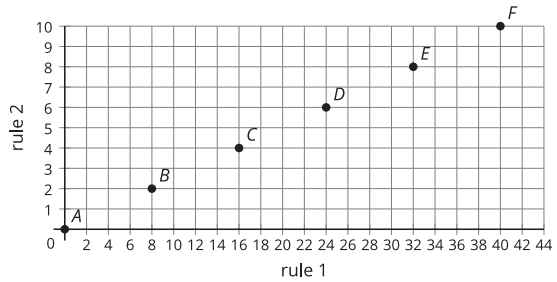
Student Responses

1. Partner A

- "How are the two graphs the same?" (There is a point at the bottom left, $(0, 0)$, on each. The points are regularly spaced and go up and to the right. They all lie at the intersection of gridlines.)
- "How are the two graphs different?" (The numbers on the axes are different. The ones for partner B get bigger really quickly.)

	A	B	C	D	E	F
rule 1	0	8	16	24	32	40
rule 2	0	2	4	6	8	10

2. C, the third column in the table, since the point has coordinates $(16, 4)$



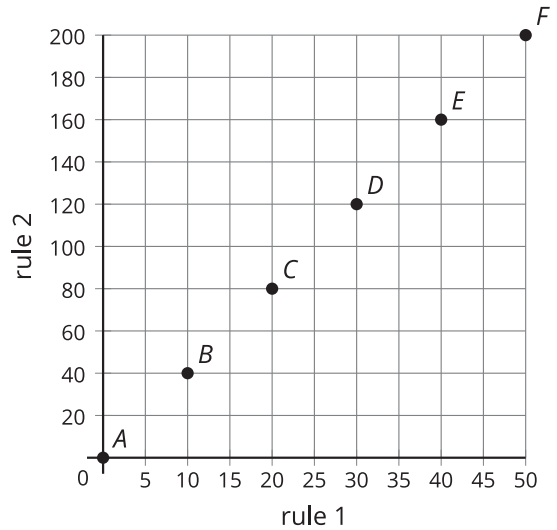
3. Included in graph above

Partner B

1.

	A	B	C	D	E	F
rule 1	0	10	20	30	40	50
rule 2	0	40	80	120	160	200

2. B, the second column in the table, since the point has coordinates $(10, 40)$



3. Included in graph above

Activity 2

15 min

Patterns on the Coordinate Grid, Part 2

PLC Activity

Standards Alignments

Addressing 5.OA.B.3

The purpose of this activity is for students to generate numerical patterns given two rules, form ordered pairs consisting of the corresponding terms, and graph the ordered pairs on the coordinate grid. The structure of the activity is the same as the previous activity but this time the multiplicative factor relating the two rules is a fraction. Monitor for students who express the relationship (MP8) between the two patterns by saying that

- the numbers in the second pattern are double the numbers in first pattern and half more
- the numbers in the second pattern are $2\frac{1}{2}$ times the numbers in the first pattern

Student-facing Task Statement

1. Use the rules to complete the table.
   - Rule 1: Start with 0. Add 2.
   - Rule 2: Start with 0. Add 5.

	A	B	C	D	E	F
Rule 1						
Rule 2						

2. What patterns do you notice between the corresponding terms of the two patterns?
3. Plot and label the points from the table.

Launch

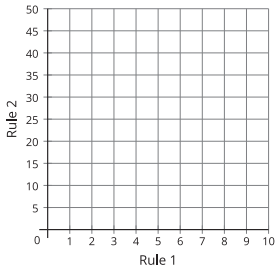
- Groups of 2.

Activity

- 5 minutes: independent time
- 5 minutes: partner work time
- Monitor for students who:
  - notice the additive relationship for each rule
  - notice the multiplicative relationship between rule 1 and rule 2

Synthesis

- Invite previously selected students to share.
- "What does point D represent in terms of the two rules? How do you know?" (When rule 1 is 6, rule 2 is 15. The coordinates are $(6, 15)$ and the horizontal coordinate is rule



4. What does the point C tell you about Rule 1 and Rule 2?

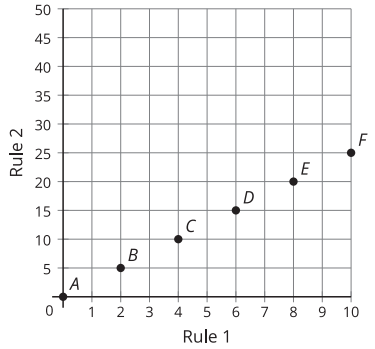
Student Responses

1.

	A	B	C	D	E	F
Rule 1	0	2	4	6	8	10
Rule 2	0	5	10	15	20	25

2. Sample response:
   - The only number in both rules is 10.
   - The numbers in rule 2 are $2\frac{1}{2}$ times the numbers in rule 1.
   - The numbers in rule 1 are $\frac{2}{5}$ times the numbers in rule 2.
   - To get to the numbers in rule 2, we add $1\frac{1}{2}$ times the number in rule 1 to the original number in rule 1.

3.



4. When the rule 1 pattern is 4, the rule 2 1 and the vertical coordinate is rule 2.)
   - Display: $(10, 20)$
   - "10 is a number in rule 1 and 20 is a number in rule 2. Is the point with coordinates $(10, 20)$ on your graph?" (No, the points that represent the two rules are $(10, 25)$ or $(8, 20)$. The 10 from rule 1 and the 20 from rule 2 don't match up with each other.)

pattern is 10.

Advancing Student Thinking

If students don't plot and label the points from the table correctly, plot points A and B and ask, "How do each of these points represent the rules?"

Lesson Synthesis

10 min

"Today, we plotted points from two patterns on a coordinate grid and noticed patterns."

Display the image from the student solution in the second activity.

"What does the graph tell you about the two rules?" (They both start at 0. That's what the point $(0, 0)$ means. Then the first rule has 2 and the second rule has 5.)

"How is looking at relationships between patterns in a table the same as looking at relationships between patterns on a coordinate grid? How is it different?" (In the table I can see each rule by going across or I can see the relationship between rules by looking at columns. The points on the coordinate grid help me visualize how the two patterns are changing relative to one another but they don't help me see the pattern for each rule.)

Suggested Centers

- Can You Draw It? (1–5), Stage 7: Grade 5 Shapes (Addressing)
- Picture Books (K–5), Stage 3: Find Shapes (Addressing)
- Can You Draw It? (1–5), Stage 4: Area and Perimeter (Supporting)

Complete Cool-Down

Response to Student Thinking

Students don't plot the points correctly.

Next Day Support

- Launch Activity 1 by reviewing a correct response to the cool-down.

Lesson 12: Represent Problems on the Coordinate Grid

Standards Alignments

Addressing 5.G.A.2, 5.OA.A.2

Teacher-facing Learning Goals

- Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate grid, and interpret coordinate values of points in the context of the situation.

Student-facing Learning Goals

- Let's represent problems on the coordinate grid.

Lesson Purpose

The purpose of this lesson is for students to represent situations by plotting and interpreting points on the coordinate grid.

The purpose of this lesson is to use the coordinate grid to represent real world data. Students work with coins in two different ways. In the first activity, they flip the coin 10 times and plot the number of heads and number of tails they get. Students plot their results on the coordinate grid and also interpret points in terms of coin flipping. In the second activity, students consider the number of coins and their total value. Again the focus is on plotting and interpreting points representing different sets of coins (MP2).

Access for:

Students with Disabilities

- Engagement (Activity 1)

Instructional Routines

MLR6 Three Reads (Activity 1), True or False (Warm-up)

Materials to Gather

- Coins: Activity 1

Lesson Timeline

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

Teacher Reflection Question

With only one lesson remaining in the unit, where do you see evidence of growth in each of your students' understandings? For students about whom you are not sure, make a note and find out more about their thinking tomorrow.

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

5 min

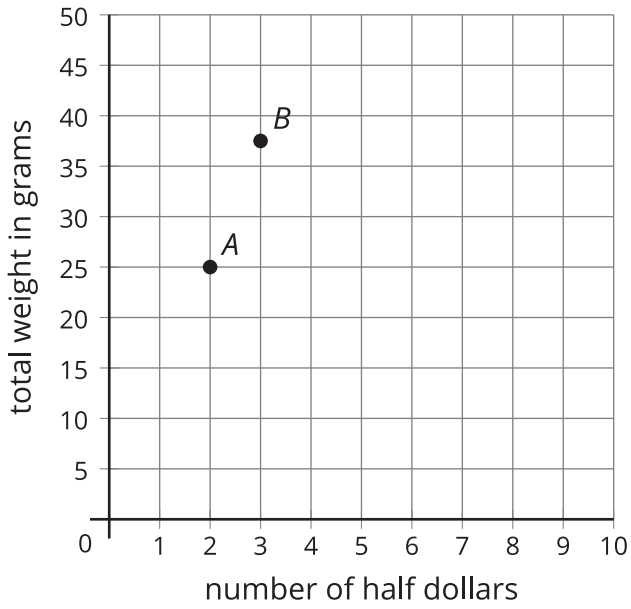
Half Dollar

Standards Alignments

Addressing 5.G.A.2

Student-facing Task Statement

The coordinate grid shows the weight of some half dollars.



Pick one of the points and describe what it represents.

Student Responses

Sample responses:

A. 2 half dollars weigh 25 grams

B. 3 half dollars weigh 37.5 grams (or 37 grams or 38 grams)

Begin Lesson

Warm-up

10 min

True or False: Addition and Multiplication

Standards Alignments

Addressing 5.OA.A.2

The purpose of this True or False is for students to demonstrate understandings they have of the properties of operations. These understandings will be helpful later when students will need to be able to use addition and multiplication to solve problems involving money. Each expression here is chosen to represent the total value of a set of coins (nickels, dimes, and quarters).

Instructional Routines

True or False

Student-facing Task Statement

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

- $(2 \times 10) + (3 \times 5) = (3 \times 10) + (1 \times 5)$
- $(3 \times 25) + (5 \times 5) = 8 \times 25$
- $(4 \times 25) + (10 \times 5) = (2 \times 25) + (10 \times 10)$

Student Responses

- True. 2 groups of 10 and 3 groups of 5 is the

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.

same as 3 groups of 10 and 1 group of 5, or $20 + 15 = 30 + 5$.

- False. $(3 \times 25) + (5 \times 5) = 4 \times 25$
- True. $100 + 50 = 50 + 100$

Synthesis

- "Which statement was your favorite to think about and why?" (I liked the first one because I could calculate all the values mentally.)

Activity 1

15 min

Heads or Tails

Standards Alignments

Addressing 5.G.A.2

The purpose of this activity is for students to plot and interpret points that represent the result of flipping a coin 10 times (MP2). Students also interpret points that are already on the graph, representing the number of heads and tails two other students got when they flipped a coin.

Students may wonder what to do if they get the same result twice or the same result as their partner since that point is already plotted on the graph. They may:

- put a letter for their name next to the point
- put a number to indicate that they got that result on their first and second coin tosses

Students may notice that the points all lie on a line (MP7). It is not necessary for students to understand why the points form a line. Focus students' attention on the meaning of each point.

This activity uses *MLR6 Three Reads*. Advances: Reading, Listening, Representing

Access for Students with Disabilities

Engagement: Develop Effort and Persistence. Invite students to generate a list of shared expectations for group work. Record responses on a display and keep visible during the activity.
Supports accessibility for: Attention, Organization

Instructional Routines

MLR6 Three Reads

Materials to Gather

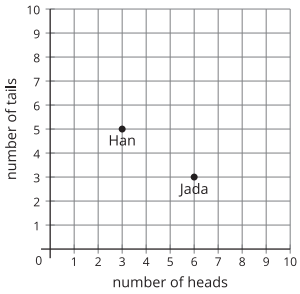
Coins

Required Preparation

- Gather pennies, nickels, dimes, and quarters to show students during the launch.

Student-facing Task Statement

Han and Jada flipped a penny several times and counted how many times it came up heads and how many times it came up tails. Their results are plotted on the graph.



1. How many heads did Jada get? How many tails did Jada get? Explain or show how you know.
2. How many heads did Han get? How many tails did Han get? Explain or show how you know.
3. Flip the coin 10 times and record how many heads and tails you get. Plot the point on the coordinate grid that represents your coin flips.
4. Show your partner the point you plotted on the coordinate grid. Look at your partner's coordinate grid. How many heads did your partner flip? How many tails did your partner flip? Explain or show your reasoning.
5. Do any of the points you plotted lie on the horizontal axis? What would a point on the horizontal axis mean in this situation?
6. If time allows, toss the coin 10 more times and record your results and your partner's results on the coordinate grid.

Launch

- Groups of 2

MLR6 Three Reads

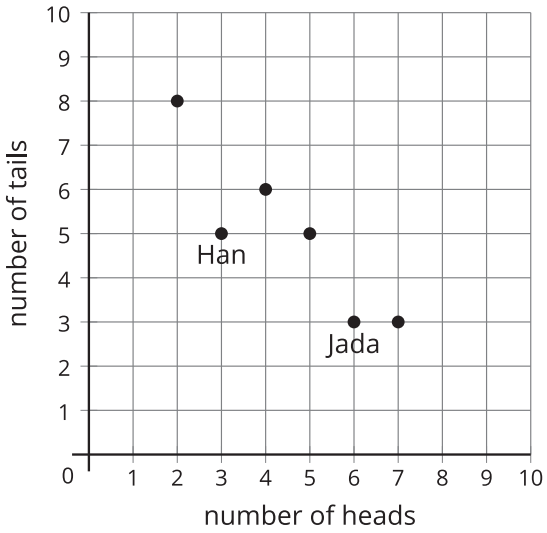
- Display only the problem stem, without revealing the grid or question(s):
- "We are going to read this problem 3 times."
- 1st Read: "Han and Jada flipped a penny several times and counted how many times it came up heads and how many times it came up tails."
- "What is this situation about?"
- 1 minute: partner discussion
- Listen for and clarify any questions about the context.
- 2nd Read: "Han and Jada flipped a penny several times and counted how many times it came up heads and how many times it came up tails."
- "Name the quantities. What can we count or measure in this situation?"
- 30 seconds: quiet think time
- 2 minutes: partner discussion
- Share and record all quantities.
- Reveal the question(s).
- 3rd Read: Read the entire problem, including question(s) aloud.
- "What are some strategies we can use to solve this problem?"

Activity

- 2 minutes: independent think time
- 8 minutes: partner work time

Student Responses

1. Jada got 6 heads and 3 tails. Her point has horizontal coordinate 6, representing the heads, and vertical coordinate 3, representing the tails.
2. Han got 3 heads and 5 tails. His point has horizontal coordinate 3, representing 3 heads, and vertical coordinate 5, representing the tails.
3. Sample response:



4. Sample response: My partner plotted the points $(4, 6)$ and $(7, 3)$. So my partner got 4 heads and 6 tails on one try and 7 heads and 3 tails on the other try.
5. Sample response: No, our points are not on the horizontal axis. A point on the horizontal axis would mean all heads (10 times) and no tails.
6. Included in graph in question 3

Synthesis

- Display the coordinate grid from the activity.
- As each student shares, ask them to explain where to plot their point on the displayed graph.
- "What are the coordinates of Jada's point?" ($(6, 3)$)
- "How many times did Jada toss the coin? How do you know?" (9 times because she got 6 heads and 3 tails.)
- Highlight the point $(10, 0)$ on the grid. "What does this point mean?" (10 heads and no tails)
- "Did anyone get this result?" (most likely no)
- "Do you think all heads happens very often?" (This probably does not happen very often because that means that you can get only heads on every toss.)

Advancing Student Thinking

If students say they aren't sure where to plot a point to represent their coin tosses, refer to the point that represents Jada's data and ask, "What does this point represent?"

Activity 2

15 min

Coin Values

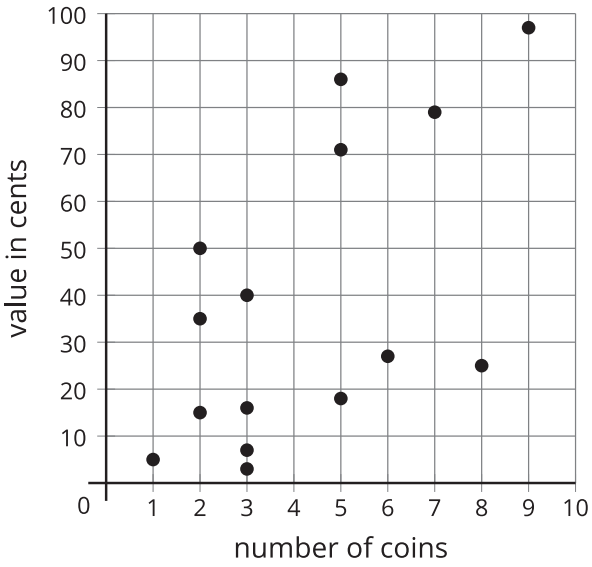
Standards Alignments

Addressing 5.G.A.2

The purpose of this activity is for students to plot and interpret points on the coordinate grid. The context remains coins but there is a variety of coins and the vertical coordinate is determined by the value of the coins. Students plot points corresponding to different combinations of coins. They identify the coordinates of plotted points and interpret them in terms of the context of coins and their value (MP2). During the activity synthesis, students discuss how they decided where to plot points and how they interpreted points on the graph.

Student-facing Task Statement

The graph shows the number and value of coins some students had with them.



1. Tyler has 1 dime, 3 nickels, and 2 pennies. Which point represents Tyler's coins? Label the point.
2. Lin has 3 quarters, 1 dime, and 1 penny.

Launch

- Groups of 2
- “What do you know about coins?” (They're round. I can buy things with them. There are different kinds and they have different values.)
- Record responses for all to see.
- Display a penny, dime, nickel, and quarter.
- If no student mentions it, say and record the value of each coin.

Activity

- 5 minutes: independent work time
- 5 minutes: partner work time

Synthesis

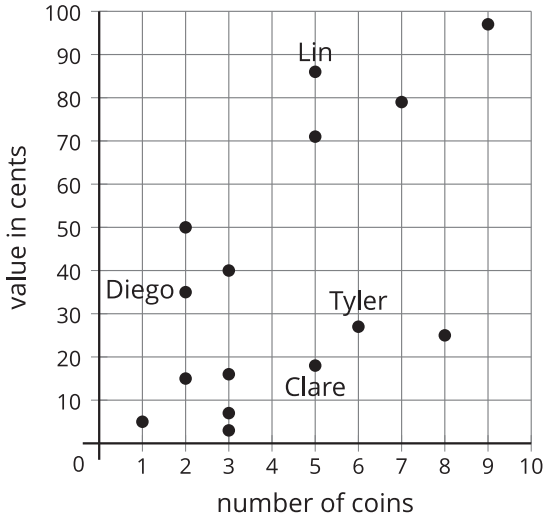
- “How did you know which point represents Tyler’s coins?” (Tyler has 6 coins so I looked for the 6 below the horizontal line at the bottom of the graph. The value of the coins is 27 cents so I looked for a point between

Which point represents Lin's coins? Label the point.

3. Diego has 1 quarter and 1 dime. Write the coordinates of the point that represents Diego's coins. Explain or show your reasoning.
4. Clare has 5 coins and does not have a quarter. Write the coordinates of the point that represents Clare's coins.
5. Which coins might Clare have? Explain or show your reasoning.

Student Responses

1.



2. See graph above
3. Diego has 2 coins and 35 cents, so the point for Diego's coins is the one with coordinates $(2, 35)$.
4. Sample response: (5,17). There are 3 points representing students with 5 coins. One has 71 cents, one is Lin, and the third looks like 17 or 18 cents.
5. For Clare to have 5 coins and 18 cents she has 1 dime, 1 nickel, and 3 pennies. For Clare to have 5 coins and 17 cents she has 3 nickels and 2 pennies. 71 is not possible because with 5 coins Clare could not reach 20 and 30 in the vertical direction, closer to 30 than 20.)

- “How did you know which point represents Clare's coins?” (There are three points that represent 5 coins. Two of them have a vertical coordinate of more than 70. That can’t be Clare because she has no quarters. So Clare is the other point representing 5 coins.)

71 cents without quarters.

Advancing Student Thinking

If students are not familiar with American coins or need support determining the total value of the coins, display only the problem stem, without revealing the question and ask, “What do you know about each student?”

Lesson Synthesis

10 min

“Today we represented real world and mathematical problems by graphing points in the first quadrant of the coordinate grid and interpreting the points.”

Display the image from the second activity.

“Which point on the graph represents the smallest number of coins? How do you know?” (The point at the bottom right since it’ ;s just 1 coin. All the others represent more than one coin.)

“Which coin does it represent? How do you know?” (It’ s a nickel because it’ s less than 10 cents but more than 1 cent.)

“Which point represents the most money? How do you know?” (The one to the top right because it’ s almost 100 cents. Everything else is below 90.)

“How many coins does that point represent? How do you know?” (9, because the horizontal coordinate is 9.)

Suggested Centers

- Can You Draw It? (1–5), Stage 7: Grade 5 Shapes (Addressing)
- Picture Books (K–5), Stage 3: Find Shapes (Addressing)

Complete Cool-Down

Response to Student Thinking

Students do not explain the information they get from the point correctly.

Next Day Support

- After the warm-up in the next lesson, pair students up to discuss their responses.

Lesson 13: Perimeter and Area of Rectangles

Standards Alignments

Addressing	5.G.A.2, 5.NBT.B.7, 5.OA.B.3
Building Towards	5.G.A.2

Teacher-facing Learning Goals

- Use the coordinate grid to understand the length and width of rectangles with fixed area.
- Use the coordinate grid to understand the length and width of rectangles with fixed perimeter.

Student-facing Learning Goals

- Let's explore the perimeter and area of rectangles on the coordinate grid.

Lesson Purpose

The purpose of this lesson is for students to examine rectangles with given perimeter or area, plotting their length and width on the coordinate grid.

The purpose of this lesson is to plot the lengths and widths of different rectangles with a given perimeter or with a given area. In a previous course, students found rectangles with the same area and different perimeter and rectangles with the same perimeter and different area. Graphing the possible lengths and widths helps to visualize and quantify these relationships. Specifically, when the perimeter is given, the relationship between the length and width is that each unit taken away from the length is added to the width. When the area is given, the relationship is more complicated and the graphs of the two situations reveal this. As students calculate side lengths they also have opportunities to perform arithmetic with fractions and decimals.

This lesson has a Student Section Summary.

Access for:

Students with Disabilities

- Representation (Activity 1)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Estimation Exploration (Warm-up)

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

As you finish up this unit, reflect on the norms and routines that have supported each student in learning math. How have you seen each student grow as a young mathematician throughout this work? How have you seen yourself grow as a teacher?

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

5 min

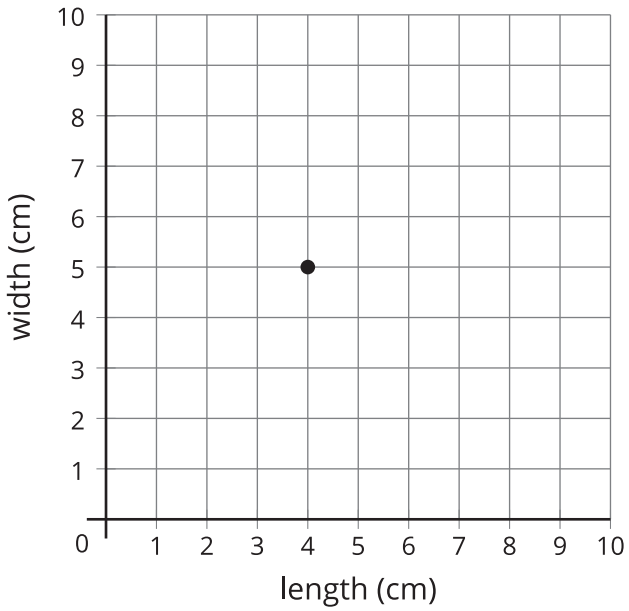
Area and Perimeter of a Rectangle

Standards Alignments

Addressing 5.OA.B.3

Student-facing Task Statement

The point represents the length and width of a rectangle.



1. What are the area and perimeter of the rectangle? Explain or show your reasoning.

2. What is a point that represents a different rectangle with the same area? Explain or show your reasoning.

Student Responses

1. Sample response:

   Area: 20 square centimeters since $4 \times 5 = 20$

   Perimeter: 18 centimeters since $(2 \times 4) + (2 \times 5) = 18$
2. Sample responses: $(2, 10)$, $(10, 2)$, $(2.5, 8)$, $(8, 2.5)$

Begin Lesson

Warm-up

10 min

Estimation Exploration: Window Washing

Standards Alignments

Building Towards 5.G.A.2

The purpose of an Estimation Exploration is for students to practice the skill of estimating a reasonable answer based on experience and known information. In this lesson they will be finding the perimeter and area of rectangles and their thinking about the size of the windows in this image prepares them for this work.

Instructional Routines

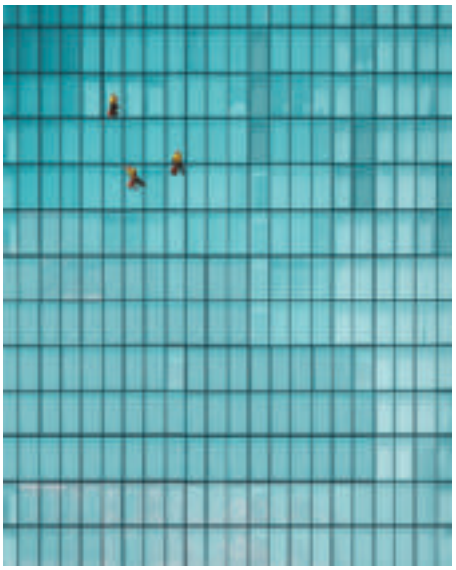
Estimation Exploration

Student-facing Task Statement

What is the area of one window?

Launch

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



Record an estimate that is:

too low	about right	too high

Student Responses

Sample responses

- too low: 10–20 sq ft
- about right: 30–100 sq ft
- too high: 350–1,000 sq ft

Activity

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

Synthesis

- "What could you use in the image to help estimate the area of the windows?" (There are the people cleaning the windows. I used the people to estimate the height and width of the windows and then multiplied to find the area.)

Activity 1

15 min

Rectangle Perimeters

Standards Alignments

Addressing 5.G.A.2, 5.NBT.B.7, 5.OA.B.3

The purpose of this activity is for students to plot points that represent the length and width of a rectangle with a given perimeter. Since the perimeter is twice the length plus twice the width, decreasing the length by a certain amount will mean that the width has to increase by the same

amount for the perimeter to stay the same. Students have an opportunity to observe this relationship in multiple ways (MP7, MP8):

- think geometrically about the perimeter of the rectangle
- look at the table of values for length and width depending on the values they used
- look at the length and width pairs plotted in the coordinate grid

Access for English Learners

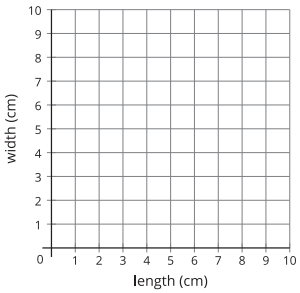
MLR8 Discussion Supports. Prior to solving the problems, invite students to make sense of the situations and take turns sharing their understanding with their partner. Listen for and clarify any questions about the context.
Advances: Reading, Representing

Access for Students with Disabilities

Representation: Access for Perception. Read tasks aloud. Students who both listen to and read the information will benefit from extra processing time.
Supports accessibility for: Language Conceptual Processing

Student-facing Task Statement

length (cm)	width (cm)



1. Jada drew a rectangle with a perimeter of 12 centimeters. What could the length and width of Jada's rectangle be? Use the table to record your answer.
2. Plot the length and width of each rectangle on the coordinate grid.
3. If Jada drew a square, how long and wide was it?
4. If Jada's rectangle was 2.5 cm long, how wide

Launch

- Groups of 2

Activity

- 2 minutes: independent think time
- 5 minutes: partner work time

Synthesis

- "How did you find the width of Jada's rectangle if it was 3.25 cm long?" (I knew that the length and width together are half the perimeter which is 6 cm. So I subtracted 3.25 from 6 and that was 2.75.)
- "What happens to the width when the length increases by 1? Why?" (The width decreases by one. This makes sense because the sum needs to say the same or else the perimeter changes.)
- "How does the graph show this?" (For each

was it? Plot this point on the coordinate grid.

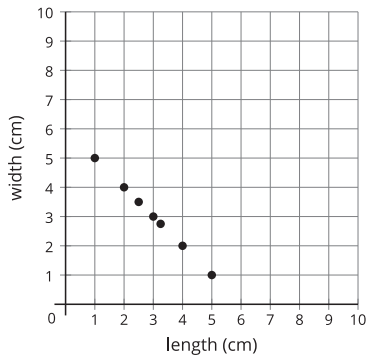
5. If Jada's rectangle was 3.25 cm long, how wide was it? Plot this point on the coordinate grid.

Student Responses

1. Sample response:

length (cm)	width (cm)
5	1
4	2
3	3
2	4
1	5

2.



3. 3 cm
4. 3.5 cm (point graphed above)
5. 2.75 cm (point graphed above)

point I plotted, I can go right one and down one and find another possible length and width.)

Advancing Student Thinking

If students are not sure how to determine the width of Jada's rectangle, prompt the student to draw a rectangle and ask, "How can you use your drawing to help you fill in the table?"

Activity 2

20 min

Rectangle Areas

Standards Alignments

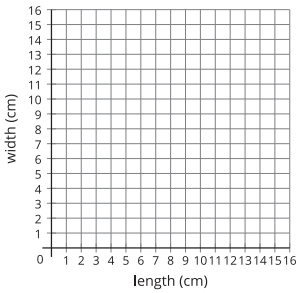
Addressing 5.G.A.2, 5.NBT.B.7

The purpose of this activity is to investigate the possible lengths and widths of a rectangle with given area. Since the area is the product of length and width, this means that the main operation being used here is multiplication or division, contrasting with the previous activity where students investigated the perimeter which is the sum of the side lengths of a rectangle. This means that the calculations are more complex and some of the coordinates of the points that students plot will either be decimals or fractions depending how students express them. There are some important common characteristics between the lengths and widths for a given area and for a given perimeter which will be examined in the activity synthesis (MP7, MP8):

- when the length increases, the width decreases
- the length and width can be switched to get another possible length and width pair

Student-facing Task Statement

length (cm)	width (cm)



1. Jada drew a rectangle with area 16 square centimeters. What could the length and width of Jada's rectangle be? Use the table to record your answer.
2. Plot the length and width of each rectangle on the coordinate grid.
3. If Jada's rectangle was 5 cm long, how

Launch

- Groups of 2

Activity

- 2 minutes: independent think time
- 5 minutes: partner work time

Synthesis

- Invite students to share their responses for the width of a rectangle that is 5 cm long.
- "How did you calculate the value?" (I knew that 5 times the width was 16 so the width is $16 \div 5$ or $\frac{16}{5}$ cm.)
- "How did you know where to plot that length and width pair?" (I looked for 5 on the horizontal axis and then I had to

wide was it? Plot this point on the coordinate grid.

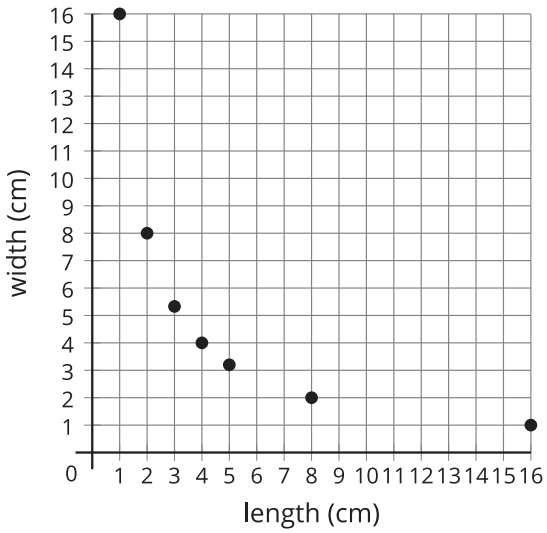
4. If Jada's rectangle was 3 cm long, how wide was it? Plot this point on the coordinate grid.
5. If Jada drew a square, how long and wide was it? Explain how you know.

Student Responses

1. Sample response:

length (cm)	width (cm)
1	16
2	8
4	4
8	2
16	1

2.



3. $3\frac{1}{5}$ or $\frac{16}{5}$ cm or equivalent (point graphed above)
4. $5\frac{1}{3}$ cm or equivalent (point graphed above)
5. 4 cm because $4 \times 4 = 16$

estimate where $3\frac{1}{3}$ was on the vertical axis. I put it a little above 3 but closer to 3 than to 4.)

- "How was determining the possible lengths and widths for a given area the same as determining the possible lengths and widths for a given perimeter?" (When the length increases the width decreases. When the width decreases the length increases. I can flip the order of the length and width and get another rectangle.)
- "How are the length and width pairs for rectangles with area 16 different from the length and width pairs for rectangles with perimeter 12?" (I was looking for a total of 16 instead of a total of 12. I have to multiply the side lengths rather than add them. When the length decreases by 1 for the perimeter, the width increases by 1. For area, when the length decreases the width increases but the relationship is more complex.)
- Consider drawing some rectangles with an of area 16 on the coordinate grid with the lower left corner of each rectangle at $(0, 0)$. Ask students what the notice about the coordinates of the upper right corners of each rectangle. (They represent the length and width of the corresponding rectangle.)

Lesson Synthesis

10 min

"Today we plotted lengths and widths of rectangles on the coordinate grid."

Display the graphs from the student solutions to the two activities together.

"How are the graphs the same?" (They both show lengths and widths of rectangles. When the length increases, the width decreases. When the length decreases, the width increases.)

"How are the graphs different?" (The length and width pairs with perimeter 12 are nicely organized. When the length increases by 1 the width decreases by 1. The length and width pairs with area 16 don't follow a clear pattern. I would not be able to guess any other values. I would have to calculate.)

Suggested Centers

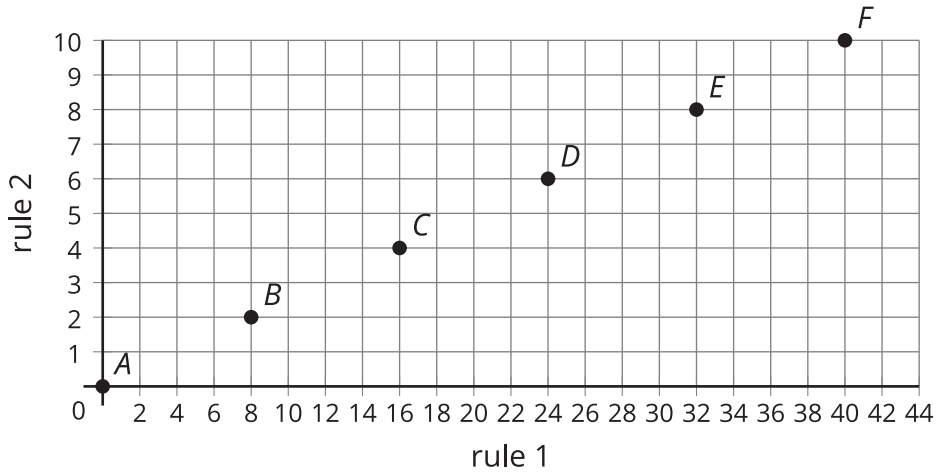
- Can You Draw It? (1–5), Stage 7: Grade 5 Shapes (Addressing)
- Picture Books (K–5), Stage 3: Find Shapes (Addressing)

Student Section Summary

In this section, we generated patterns and recognized relationships between two different patterns.

	A	B	C	D	E	F
rule 1: Start at 0. Add 8.	0	8	16	24	32	40
rule 2: Start at 0. Add 2.	0	2	4	6	8	10

Each number in rule 1 is 4 times the value of the corresponding number in rule 2 and each number in rule 2 is $\frac{1}{4}$ times the value of the corresponding number in rule 1. We also plotted the rules together on a coordinate grid.



We also used the coordinate plane to represent other situations such as the length and width of rectangles with given area or perimeter.

Complete Cool-Down

Response to Student Thinking

Students do not have a strategy to compute area and perimeter.

Prior Unit Support

Grade 4, Unit 6, Section C: Multi-digit Division

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Family Support Materials

Family Support Materials

Shapes on the Coordinate Plane

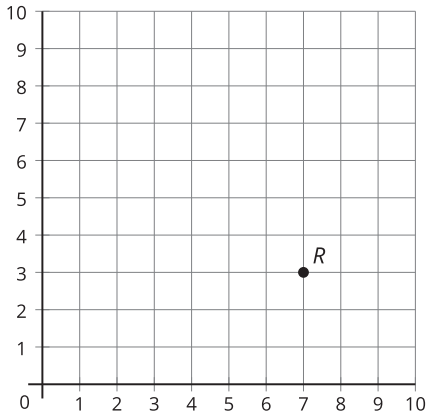
In this unit, students are introduced to the structure of the coordinate grid, and the convention and notation of coordinates to name points. They classify triangles and quadrilaterals in a hierarchy based on properties of side length and angle measure. In their work with numerical patterns, students generate two different numerical patterns, and identify relationships between the corresponding terms in the patterns.

Section A: The Coordinate Plane

In this section, students explore the coordinate grid.

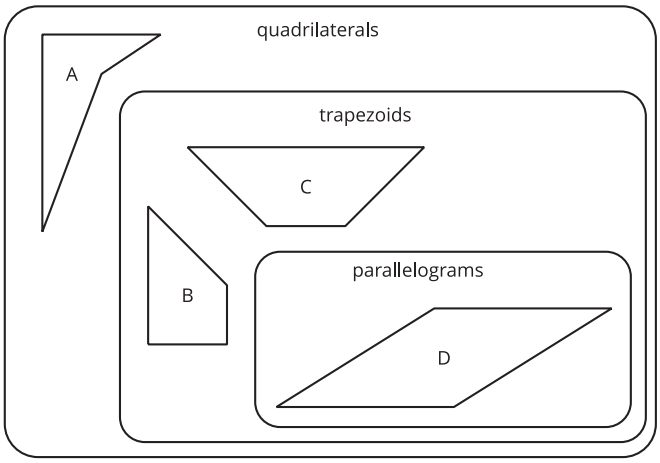
- They recognize that a point is located where two lines intersect.
- They describe points on the grid based on the numbers on the horizontal and vertical axes.

For example, the point shown is located at $(7, 3)$.



Section B: The Hierarchy of Shapes

In this section, students learn more about shapes. They sort different types of triangles and quadrilaterals based on what the shapes have in common. They classify the shapes into categories and subcategories. For example,



Section C: Numerical Patterns

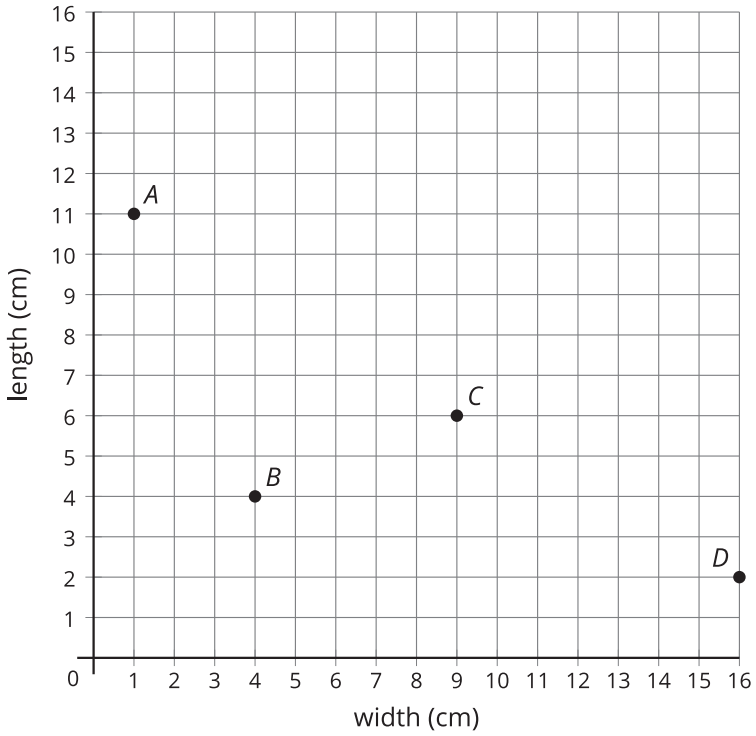
In this section, students generate patterns and explore relationships between patterns. For example:

Rule 1: Start with 0. Add 4.
Generate a pattern for rule 1.

Rule 2: Start with 0. Add 6.
Generate a pattern for rule 2.

Compare your patterns. What relationships do you notice?

After students become familiar with generating patterns from rules and explaining relationships between patterns, they plot pairs of numbers from two patterns on a coordinate grid. They also represent and solve problems by graphing points on the coordinate grid.



Try it at home!

Near the end of the unit, ask your student to solve the following problem:

This coordinate grid represents information about rectangles A–D. Based on the coordinate grid, what do we know about each of these rectangles?

Questions that may be helpful as they work:

- What strategy are you going to use to help you solve the problem?
- How can you show the rectangles represented by these points on the grid?
- Add another point to the grid that represents a different rectangle and describe the rectangle to me.

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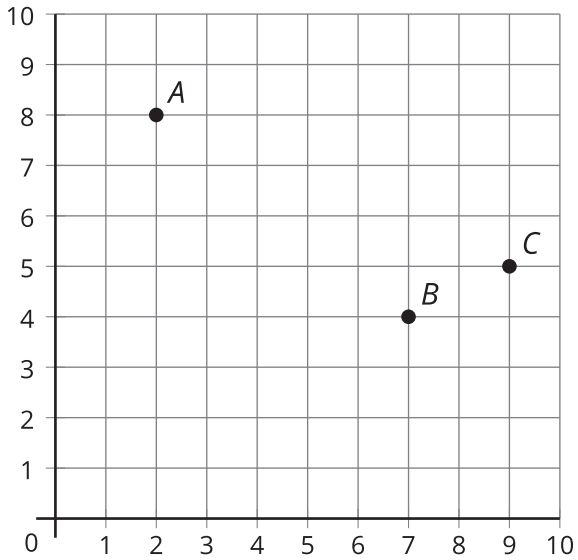
Unit Assessments

Check Your Readiness A, B and C

End-of-Unit Assessment

Shapes on the Coordinate Plane: Section A Checkpoint

1. a. Write the coordinates for each point on the grid.

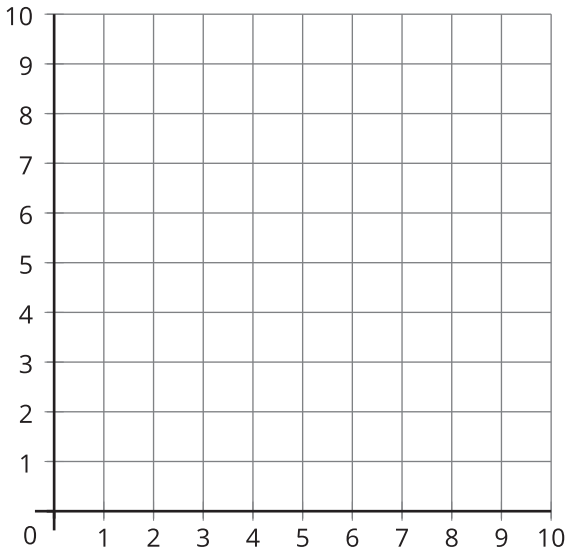


b. Locate the point (3,0) on the grid and label it D.

c. Locate the point (0,5) on the grid and label it E.

2. For each set of points, decide if they lie on a vertical line, a horizontal line, or neither. Use the grid if it is helpful.

a. (1,5), (2,5), (3,5)

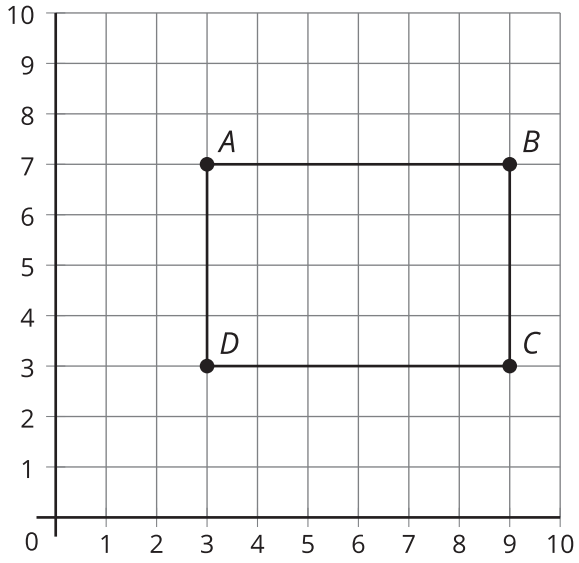


b. (1,1), (2,2), (3,3)

c. (6,0), (2,0), (5,0)

Shapes on the Coordinate Plane: Section B Checkpoint

1. What type of quadrilateral is $ABCD$? Select **all** that apply.



A. parallelogram

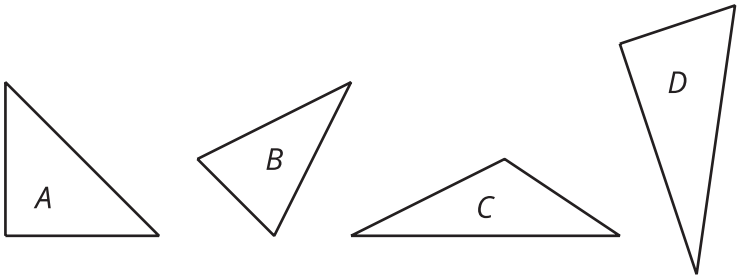
B. rhombus

C. rectangle

D. trapezoid

E. square

2. a. Which of the triangles are right triangles?



b. Which of the triangles are isosceles triangles?

3. Fill in each blank with “always,” “sometimes,” or “never” to make each statement true.

a. A parallelogram is _____ a rectangle.

b. A rectangle is _____ a square.

c. A square is _____ a quadrilateral.

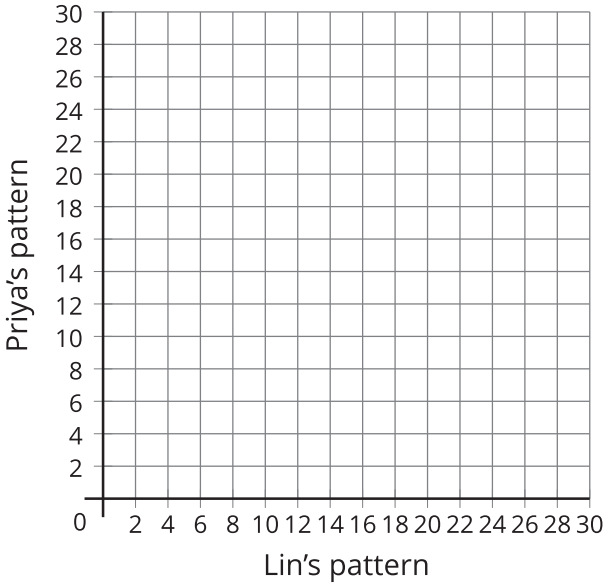
Shapes on the Coordinate Plane: Section C Checkpoint

1. Lin and Priya create patterns with these rules. Lin’s rule is start with 0 and keep adding 2. Priya’s rule is start with 0 and keep adding 4.

Lin	0	2	4	6	8	10
Priya	0	4	8	12	16	20

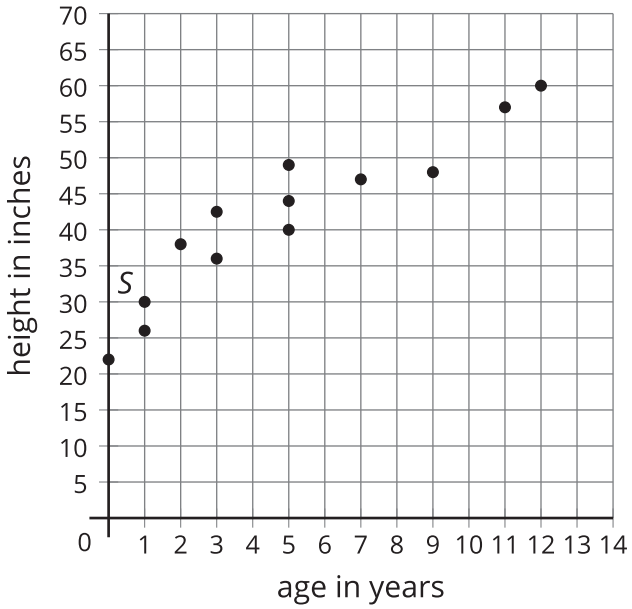
a. What number will be on Priya's list when Lin's number is 26? Explain or show your reasoning.

b. What number will be on Lin's list when Priya's number is 240? Explain or show your reasoning.



c. Plot the points from the table on the coordinate grid.

2. Here is some data for the height and age of children in Clare's neighborhood.



a. Clare's brother is 5 years old and has a height of 49 inches. Label the point that represents Clare's brother B.

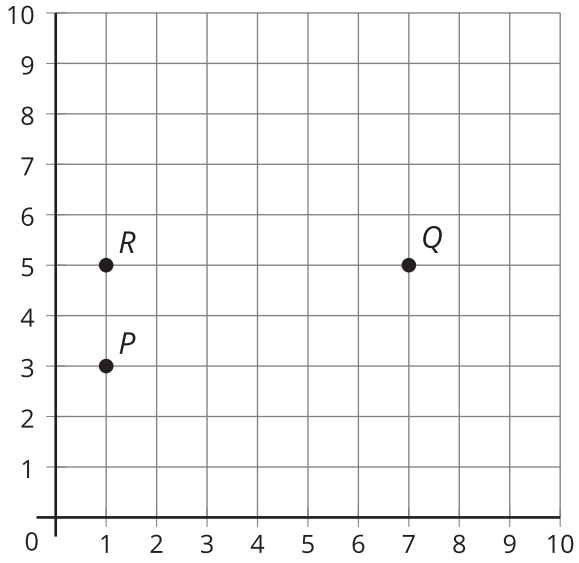
b. The point S represents Clare's sister. How tall is Clare's sister? How old is Clare's sister?

_____

_____

Shapes on the Coordinate Plane: End-of-Unit Assessment

1. Select **all** true statements about the points on the graph.



A. The coordinates of P are $(1, 3)$.

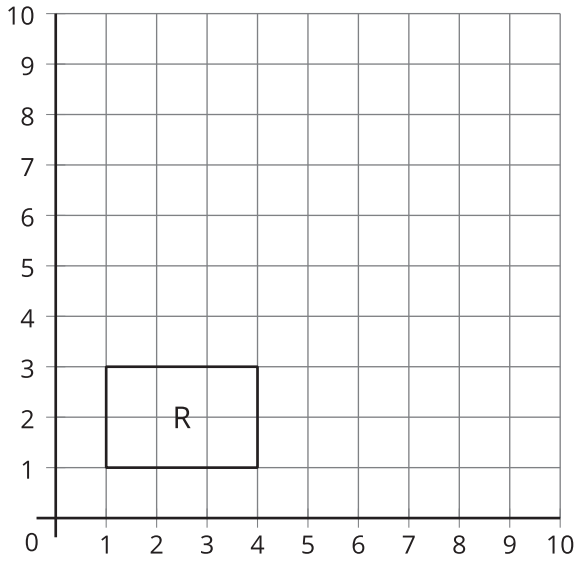
B. The coordinates of P are $(3, 1)$.

C. The coordinates of Q are $(7, 5)$.

D. The horizontal coordinate of P is the same as the horizontal coordinate of R.

E. The horizontal coordinate of Q is the same as the horizontal coordinate of R.

2. a. Explain why quadrilateral R is a rectangle.



b. Draw a rhombus in the coordinate plane that is not a square. Explain why it is a rhombus and why it is not a square.

3. Fill in each blank with the correct word, “sometimes,” “always,” or “never.”

a. A parallelogram is _____ a rhombus.

b. A rhombus is _____ a parallelogram.

c. A rectangle is _____ a rhombus.

d. A quadrilateral with a 35 degree angle is _____ a rectangle.

4. For a quadrilateral:

- one pair of sides have the same length
- the other pair of sides also have the same length
- the sides are not all the same length

What could the quadrilateral be? Select **all** that apply.

A. trapezoid

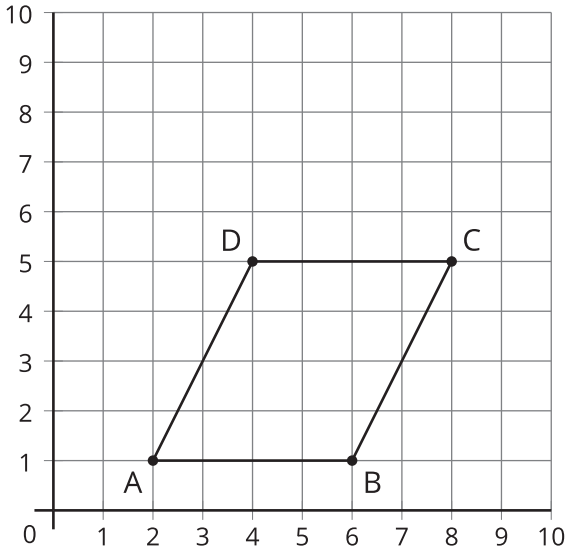
B. parallelogram

C. rhombus

D. rectangle

E. square

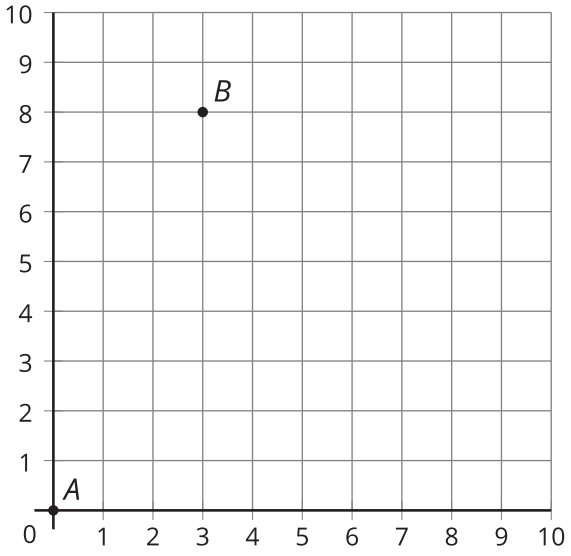
5. a. Is quadrilateral $ABCD$ a parallelogram? Explain or show your reasoning.



b. Is quadrilateral $ABCD$ a rhombus? Explain or show your reasoning.

c. Is quadrilateral $ABCD$ a rectangle? Explain or show your reasoning.

6. a. What are the coordinates of the point labeled A? Explain or show your reasoning.



b. What are the coordinates of the point labeled B? Explain or show your reasoning.

7. Here are two rules and the beginning of their patterns.

   - Jada’s rule: Start with 0 and keep adding 25.

0	25	50	75	100

   - Priya’s rule: Start with 0 and keep adding 5.

0	5	10	15	20

Select **all** true statements about the patterns.

A. All of the numbers in Priya's pattern are in Jada's pattern.

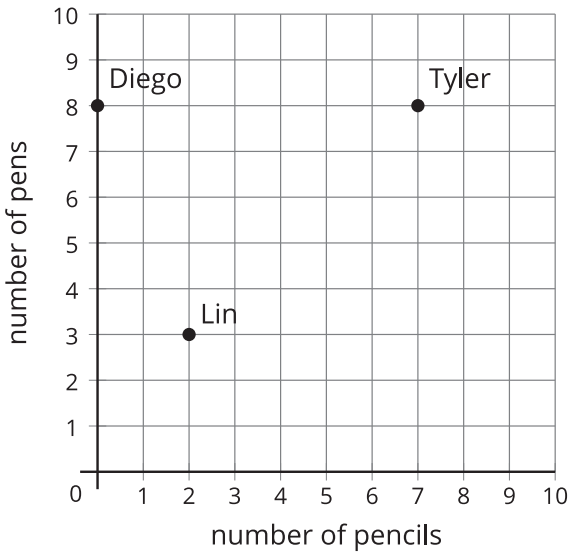
B. When Priya's pattern has 200, Jada's pattern has 1,000.

C. Each number in Jada's pattern is 5 times the corresponding number in Priya's pattern.

D. The number 220 is in Jada's pattern and in Priya's pattern.

E. Each number in Priya's pattern is $\frac{1}{5}$ the corresponding number in Jada's pattern.

8. a. How many pencils does Diego have? How many pens?



b. Do any of the students have the same number of pens as pencils? Explain or show your reasoning.

c. Mai has the same number of pencils as Tyler and the same number of pens as Lin. What are the coordinates of the point that represents Mai? Explain or show your reasoning. Label this point on the graph.

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Assessment Answer Keys

Check Your Readiness A, B and C

End-of-Unit Assessment

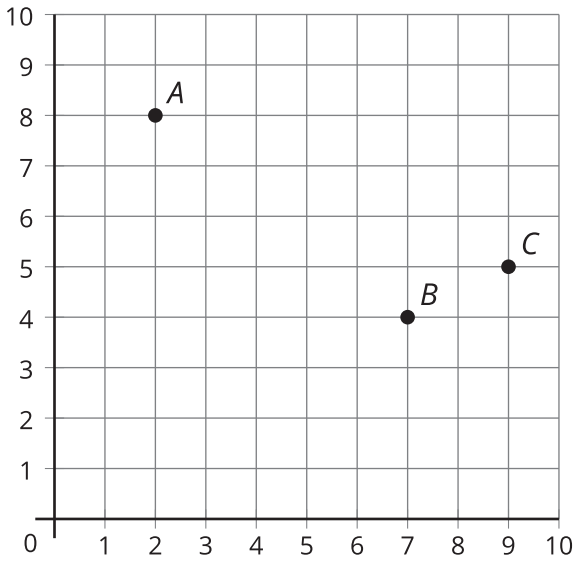
Assessment Answer Keys
Assessment: Section A Checkpoint

Problem 1

Goals Assessed

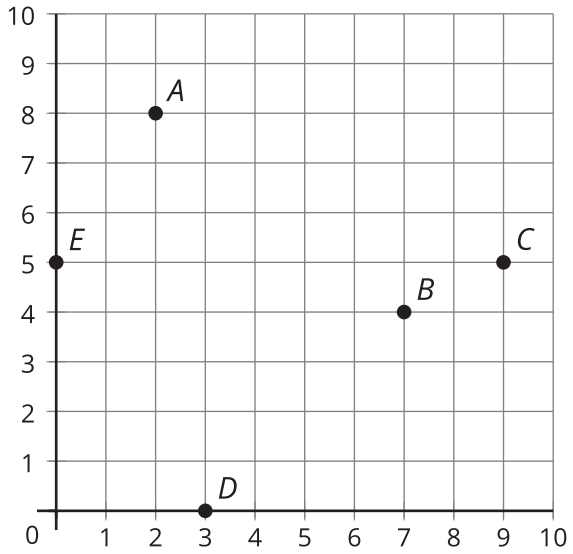
- Locate points on a coordinate grid.

a. Write the coordinates for each point on the grid.
b. Locate the point (3,0) on the grid and label it D.
c. Locate the point (0,5) on the grid and label it E.



Solution

A = (2,8), B = (7,4), C = (9,5)



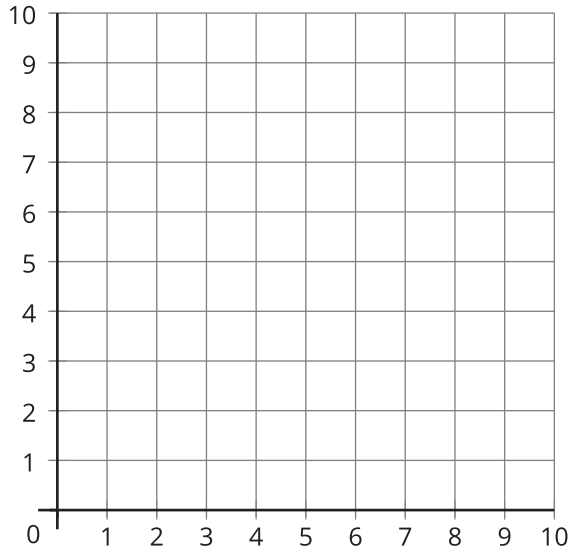
Problem 2

Goals Assessed

- Locate points on a coordinate grid.

For each set of points, decide if they lie on a vertical line, a horizontal line, or neither. Use the grid if it is helpful.

a. (1,5), (2,5), (3,5)
b. (1,1), (2,2), (3,3)
c. (6,0), (2,0), (5,0)



Solution

a. They lie on a horizontal line with vertical coordinate 5.
b. They do not lie on a horizontal line or on a vertical line.
c. They lie on the horizontal axis so they are on a horizontal line.

Assessment: Section B Checkpoint

Teacher Instructions

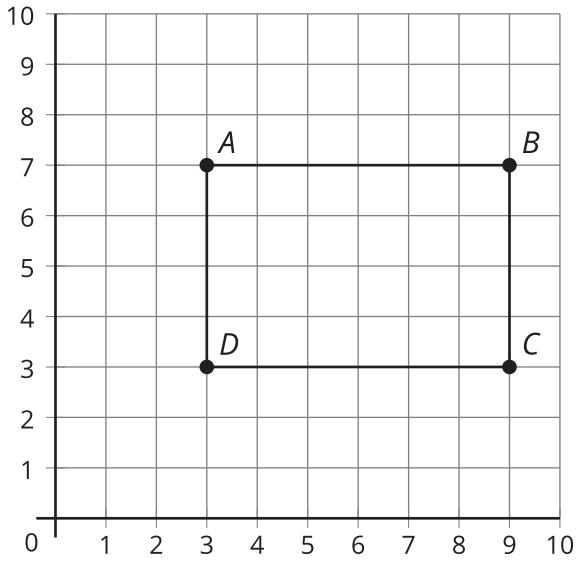
Give students access to straight edges.

Problem 1

Goals Assessed

- Classify triangles and quadrilaterals in a hierarchy based on angle measurements and side lengths.

What type of quadrilateral is $ABCD$? Select **all** that apply.



A. parallelogram

B. rhombus

C. rectangle

D. trapezoid

E. square

Solution

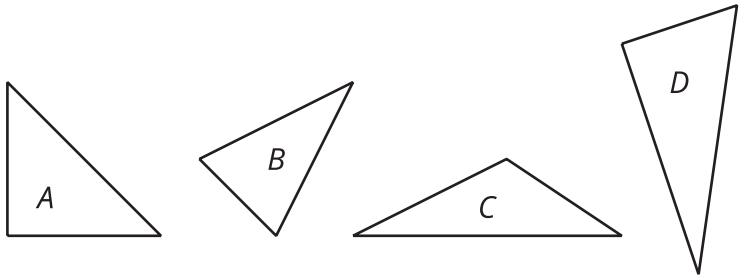
["A", "C", "D"]

Problem 2

Goals Assessed

- Classify triangles and quadrilaterals in a hierarchy based on angle measurements and side lengths.

a. Which of the triangles are right triangles?



b. Which of the triangles are isosceles triangles?

Solution

a. A, D
b. A, B

Problem 3

Goals Assessed

- Classify triangles and quadrilaterals in a hierarchy based on angle measurements and side lengths.

Fill in each blank with “always,” “sometimes,” or “never” to make each statement true.

a. A parallelogram is _____ a rectangle.
b. A rectangle is _____ a square.
c. A square is _____ a quadrilateral.

Solution

a. sometimes
b. sometimes
c. always

Assessment: Section C Checkpoint

Problem 1

Goals Assessed

- Generate, identify, and graph relationships between corresponding terms in two patterns, given a rule.

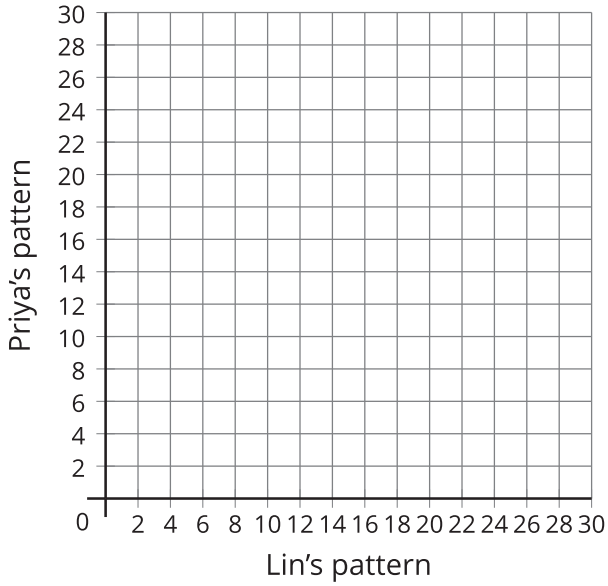
Lin and Priya create patterns with these rules. Lin’s rule is start with 0 and keep adding 2. Priya’s rule is start with 0 and keep adding 4.

Lin	0	2	4	6	8	10
Priya	0	4	8	12	16	20

a. What number will be on Priya's list when Lin's number is 26? Explain or show your reasoning.

b. What number will be on Lin's list when Priya's number is 240? Explain or show your reasoning.

c. Plot the points from the table on the coordinate grid.

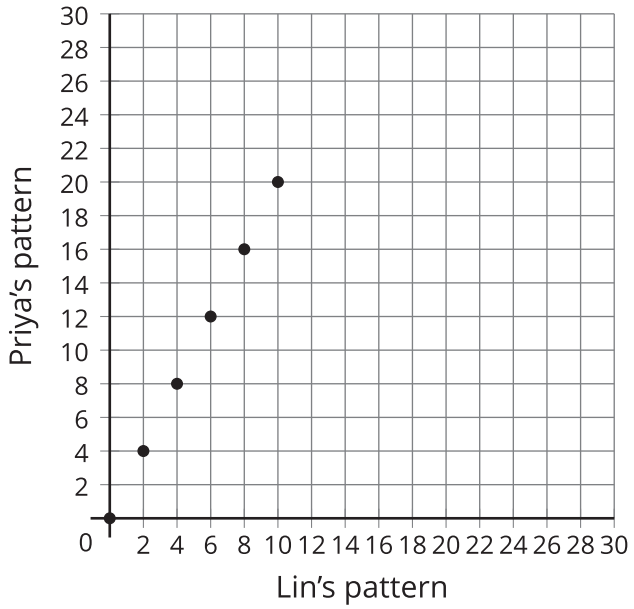


Solution

a. 52 because Priya's numbers are twice the corresponding numbers on Lin's list.

b. 120 because Lin's numbers are half the corresponding numbers on Priya's list.

c.

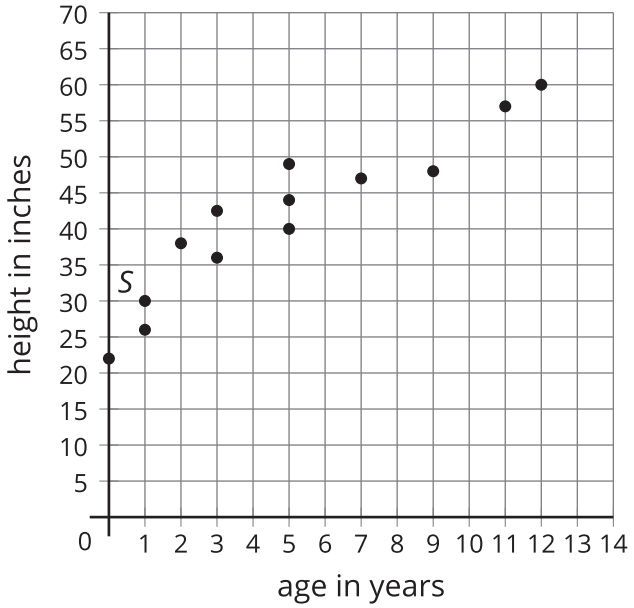


Problem 2

Goals Assessed

- Represent and interpret real world and mathematical problems on a coordinate grid.

Here is some data for the height and age of children in Clare's neighborhood.



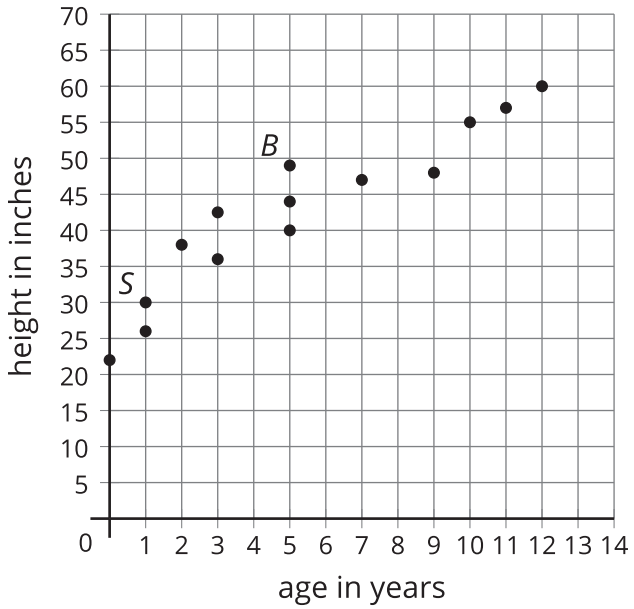
a. Clare's brother is 5 years old and has a height of 49 inches. Label the point that represents

Clare’s brother B.

b. The point S represents Clare’s sister. How tall is Clare's sister? How old is Clare's sister?

Solution

a.



b. Clare’s sister is 1 year old and has a height of 30 inches.

Assessment: End-of-Unit Assessment

Teacher Instructions

Give students access to straight edges.

Problem 1

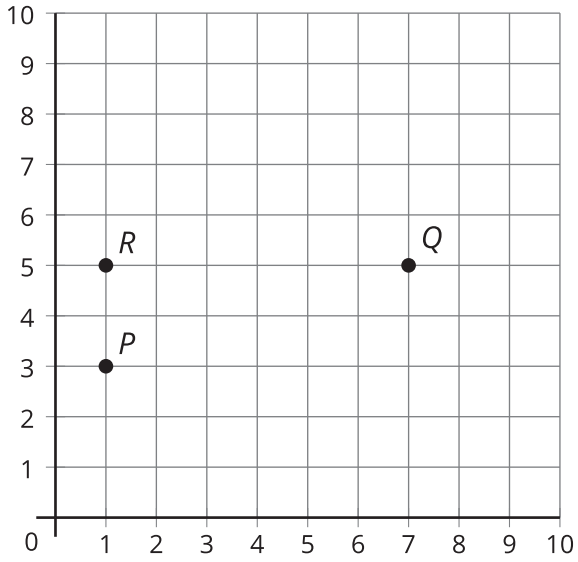
Standards Alignments

Addressing 5.G.A.1

Narrative

Students analyze statements about the coordinates of points on the coordinate grid. Students may confuse the horizontal and vertical coordinates. If they do so consistently, then they will select the distractors B and E and will not select any of the correct responses. This is a simple misconception which can readily be addressed. A more subtle misconception could lead to choosing E and not choosing D, namely that points R and Q lie on the same horizontal line but that means that their vertical coordinates are the same.

Select **all** true statements about the points on the graph.



A. The coordinates of P are $(1, 3)$.

B. The coordinates of P are $(3, 1)$.

C. The coordinates of Q are $(7, 5)$.

D. The horizontal coordinate of P is the same as the horizontal coordinate of R.

E. The horizontal coordinate of Q is the same as the horizontal coordinate of R.

Solution

["A", "C", "D"]

Problem 2

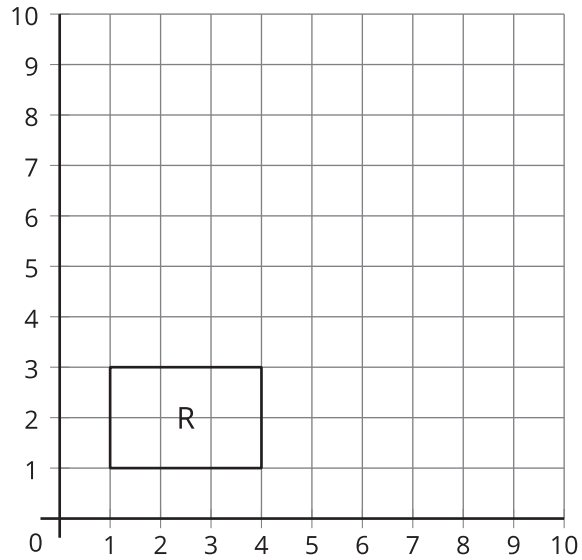
Standards Alignments

Addressing 5.G.A.1, 5.G.B.4

Narrative

Students describe quadrilaterals in the coordinate plane. They use the fact that the gridlines are perpendicular in order to explain why a quadrilateral is a rectangle and they use their understanding of quadrilaterals and the coordinate grid to draw a rhombus that is not a square.

a. Explain why quadrilateral R is a rectangle.

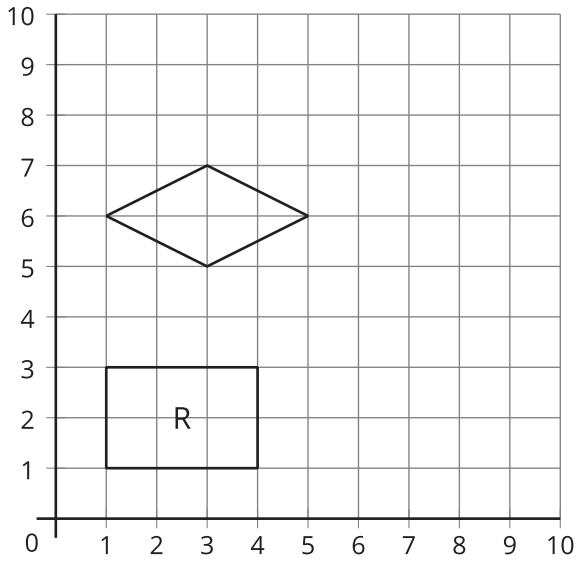


b. Draw a rhombus in the coordinate plane that is not a square. Explain why it is a rhombus and why it is not a square.

Solution

a. The grid lines on the coordinate grid are perpendicular so this means that the 4 angles in R are all right angles.

b. Sample response. The shape is a rhombus because each side goes over 2 and up or down 1 on the grid. It is not a square because it does not have any right angles.



Problem 3

Standards Alignments

Addressing 5.G.B.3, 5.G.B.4

Narrative

Students show understanding of the taxonomy of quadrilaterals by relating different types of quadrilaterals. Students who do not perform well on this task might profit from studying the classroom chart for quadrilaterals. Ask them to look at the chart and see how it helps answer the questions. Then ask them to think more about the chart and why each relationship it shows is true.

Fill in each blank with the correct word, “sometimes,” “always,” or “never.”

a. A parallelogram is _____ a rhombus.

b. A rhombus is _____ a parallelogram.

c. A rectangle is _____ a rhombus.

d. A quadrilateral with a 35 degree angle is _____ a rectangle.

Solution

a. sometimes
b. always
c. sometimes
d. never

Problem 4

Standards Alignments

Addressing 5.G.B.4

Narrative

Students decide if a quadrilateral belongs to different categories based on properties of the quadrilateral. All four sides being equal is the defining property of a rhombus and is also a defining property of a square so this rules out these two categories. Trapezoids, parallelograms, and rectangles can all have two pairs of different equal sides. If a class decides on the exclusive definition of a trapezoid, then a trapezoid cannot have two pairs of equal sides.

For a quadrilateral:

- one pair of sides have the same length
- the other pair of sides also have the same length
- the sides are not all the same length

What could the quadrilateral be? Select **all** that apply.

A. trapezoid
B. parallelogram
C. rhombus
D. rectangle
E. square

Solution

["A", "B", "D"]

Problem 5

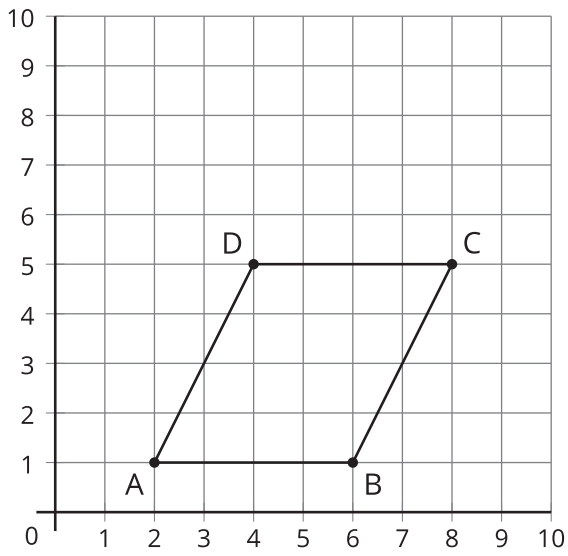
Standards Alignments

Addressing 5.G.B

Narrative

Students classify a quadrilateral given on a coordinate grid. They will need to understand the defining properties of parallelograms, rhombuses, and rectangles in order to appropriately classify the given quadrilateral. In order to justify that the slanted opposite sides AD and BC are parallel, students may extend the lines and say that they do not appear to meet or they can give an argument based on the structure of the coordinate grid.

a. Is quadrilateral $ABCD$ a parallelogram? Explain or show your reasoning.



b. Is quadrilateral $ABCD$ a rhombus? Explain or show your reasoning.

c. Is quadrilateral $ABCD$ a rectangle? Explain or show your reasoning.

Solution

a. Yes. Sides AB and CD are on horizontal lines which are parallel. Sides AD and BC each go 2 squares over and 4 squares up. They go in the same direction so they won't meet and they are parallel.

b. No. Side BC is longer than side AB.

c. No. None of the angles is a right angle.

Problem 6

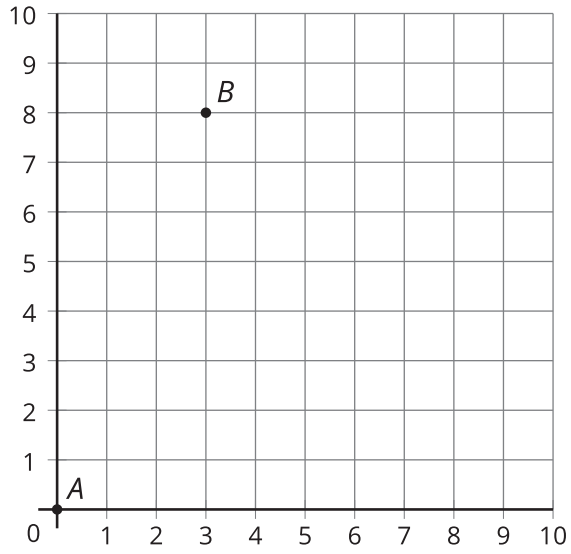
Standards Alignments

Addressing 5.G.A.1

Narrative

Students explain the meaning of the coordinates of two points in terms of the distance from the axes. Of particular interest is the origin which lies both on the horizontal axis and on the vertical axis. This means that its coordinates are $(0, 0)$. Students may occasionally or systematically confuse the vertical axis and horizontal axis right now and will get better distinguishing them with practice.

a. What are the coordinates of the point labeled A? Explain or show your reasoning.



b. What are the coordinates of the point labeled B? Explain or show your reasoning.

Solution

a. $A = (0, 0)$ because it is on the horizontal and vertical axes.

b. $B = (3, 8)$ because it is 3 units from the vertical axis and 8 units from the horizontal axis.

Problem 7

Standards Alignments

Addressing 5.OA.B.3

Narrative

Students generate patterns, given two rules, and identify relationships between corresponding terms in the two patterns. Students may select A if they confuse the two patterns. Students may select D if they commit an arithmetic error. Students who do not select B may be trying to continue the patterns and make an error as opposed to seeing the structure in the patterns. If students do not select E they may need more work with fraction multiplication.

Here are two rules and the beginning of their patterns.

- Jada’s rule: Start with 0 and keep adding 25.

0	25	50	75	100

- Priya’s rule: Start with 0 and keep adding 5.

0	5	10	15	20

Select **all** true statements about the patterns.

A. All of the numbers in Priya's pattern are in Jada's pattern.

B. When Priya's pattern has 200, Jada's pattern has 1,000.

C. Each number in Jada's pattern is 5 times the corresponding number in Priya's pattern.

D. The number 220 is in Jada's pattern and in Priya's pattern.

E. Each number in Priya's pattern is $\frac{1}{5}$ the corresponding number in Jada's pattern.

Solution

["B", "C", "E"]

Problem 8

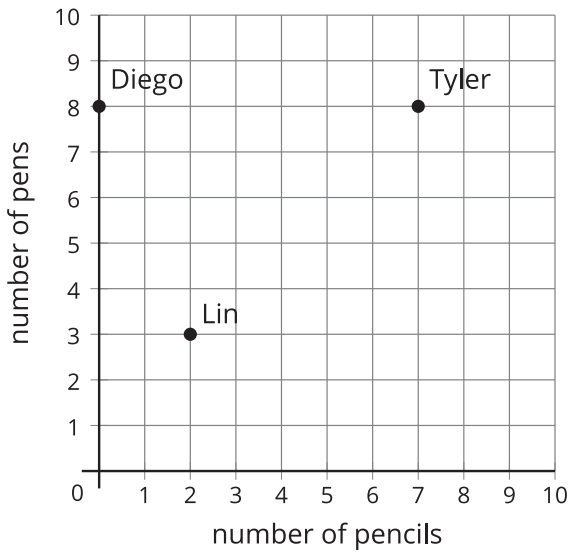
Standards Alignments

Addressing 5.G.A.2

Narrative

Students interpret the meaning of points in the coordinate plane in context and plot a point demonstrating understanding of the coordinate plane in context. To decide if any of the plotted points represent having the same number of pens as pencils, students can interpret the meaning of each point. Students who do not find the right number of pens or pencils for Mai or who do not plot her point accurately may need more practice interpreting and plotting points in context.

a. How many pencils does Diego have? How many pens?



b. Do any of the students have the same number of pens as pencils? Explain or show your reasoning.

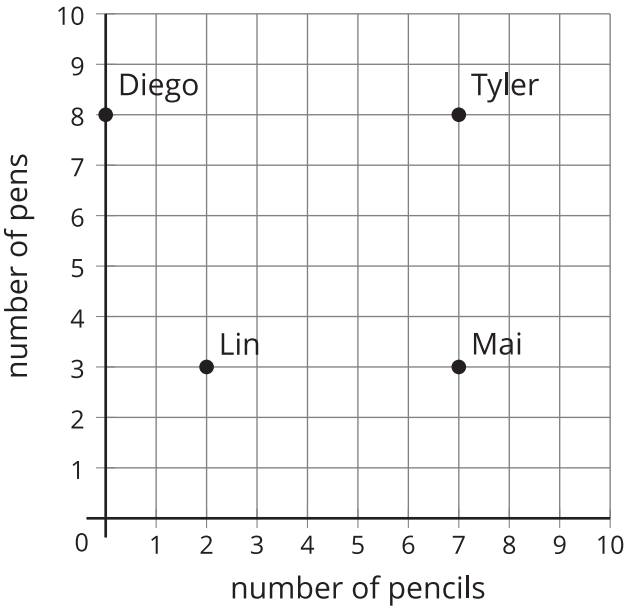
c. Mai has the same number of pencils as Tyler and the same number of pens as Lin. What are the coordinates of the point that represents Mai? Explain or show your reasoning. Label this point on the graph.

Solution

a. Diego has no pencils and 8 pens.

b. No, they all have more pens than pencils.

c. Tyler has 7 pencils and Lin has 3 pens. So the coordinates for Mai's point are (7,3).


10
9
8
7
6
5
4
3
2
1
0
1 2 3 4 5 6 7 8 9 10
number of pens
number of pencils
Diego
Tyler
Lin
Mai

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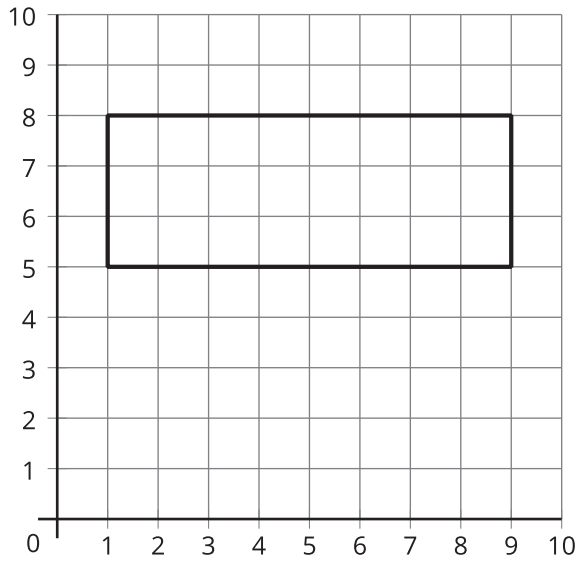
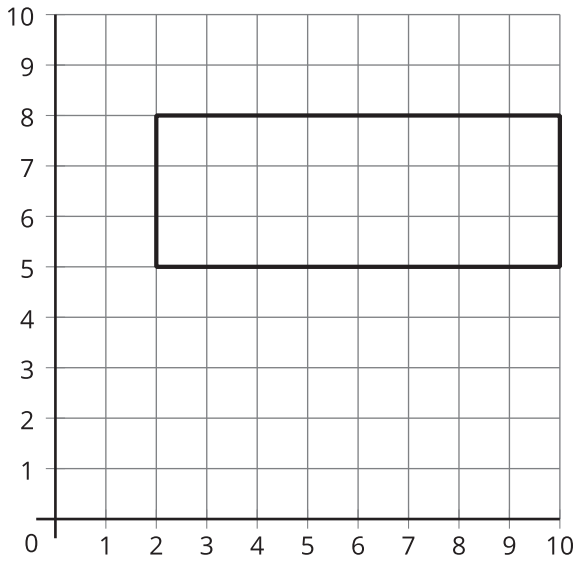
Lesson Cool Downs

Lesson 1: Explore the Coordinate Grid

Cool Down: The Last Two Shapes

Elena and Lin were playing a round of Guess Which One. These are the last two shapes. What question can Elena ask to determine which shape is the one that Lin picked?

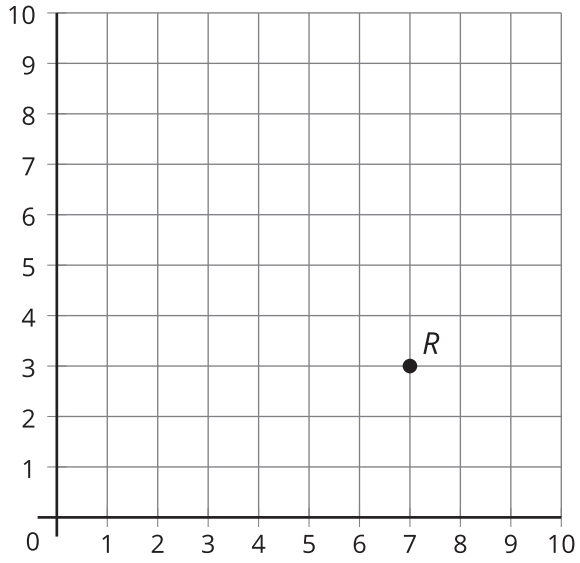




Lesson 2: Points on the Coordinate Grid

Cool Down: Coordinates

1. What are the coordinates of point R ?

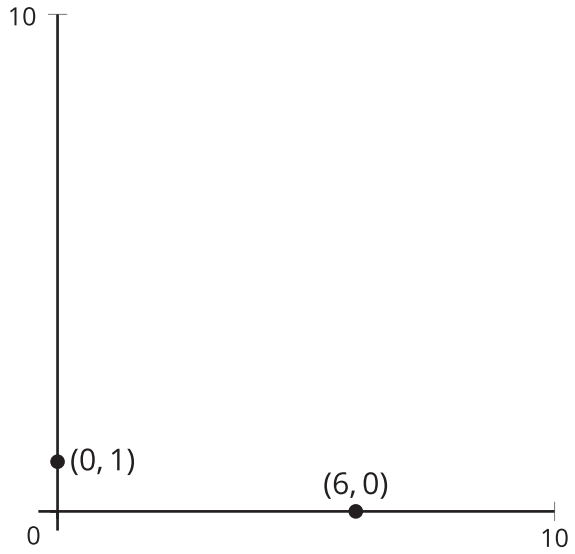


2. Plot point T at (3,7).

Lesson 3: Plot More Points

Cool Down: Missing Coordinate

Here is a coordinate plane with some points labeled.

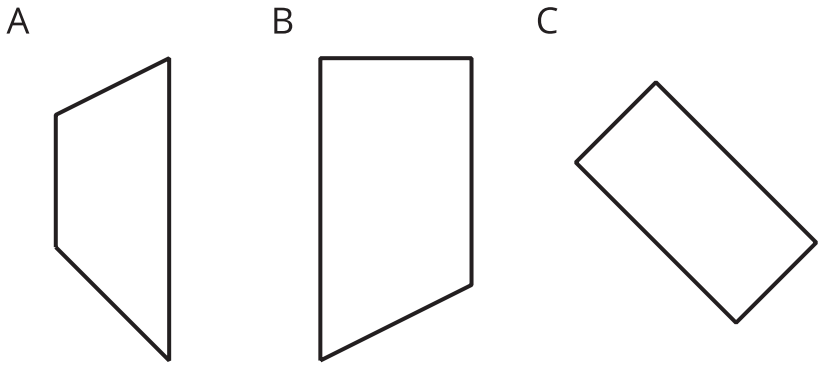


Plot and label the points $(3, 0)$, $(0, 2)$ and $(3, 2)$. Explain or show your reasoning.

Lesson 4: Sort Quadrilaterals

Cool Down: Choose Two

1. Choose two of the quadrilaterals. What are they called?



2. Name an attribute the two quadrilaterals share.

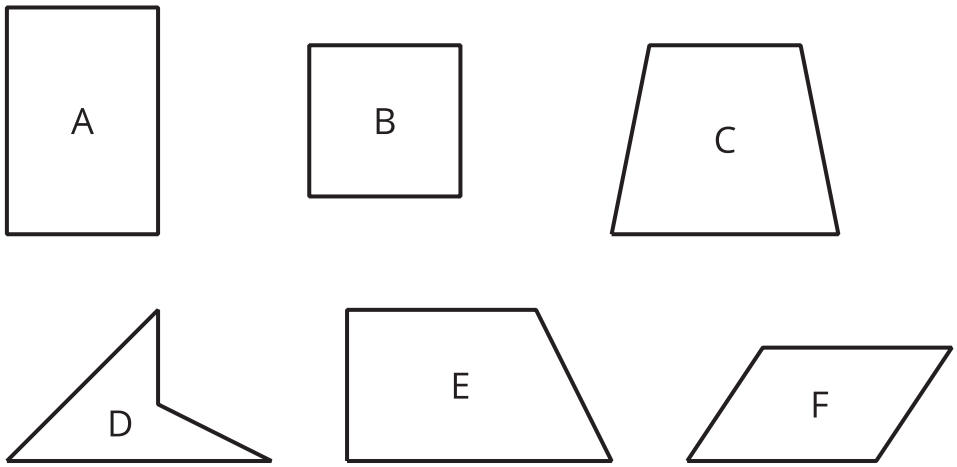
What is one way the two shapes are different?

Lesson 5: Trapezoids

Cool Down: Which Ones are Trapezoids?

1. When is a quadrilateral also a trapezoid?

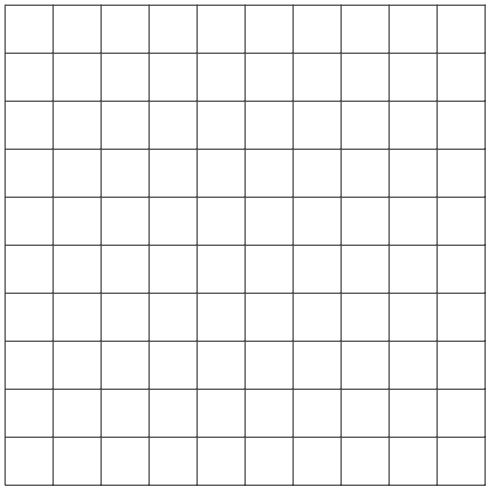
2. Which of the following shapes are trapezoids? Show or explain your reasoning.



Lesson 6: Hierarchy of Quadrilaterals

Cool Down: Rhombuses as Parallelograms

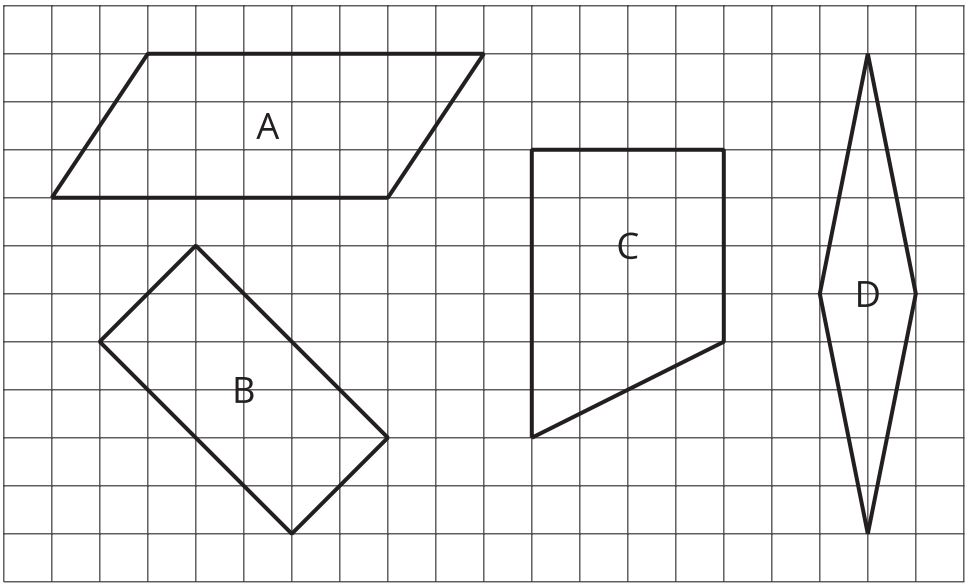
Explain why a rhombus is always a parallelogram. Use the grid if it is helpful.

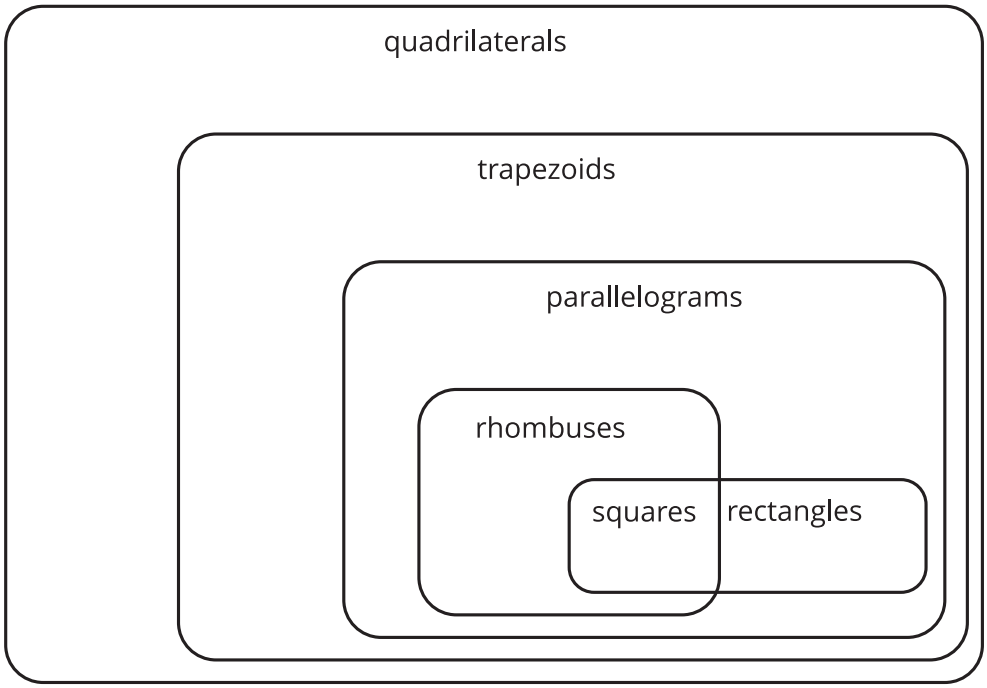


Lesson 7: Rectangles and Squares

Cool Down: Quadrilaterals in the Venn Diagram

Draw the shape or write the letter for each shape in the correct location on the diagram:

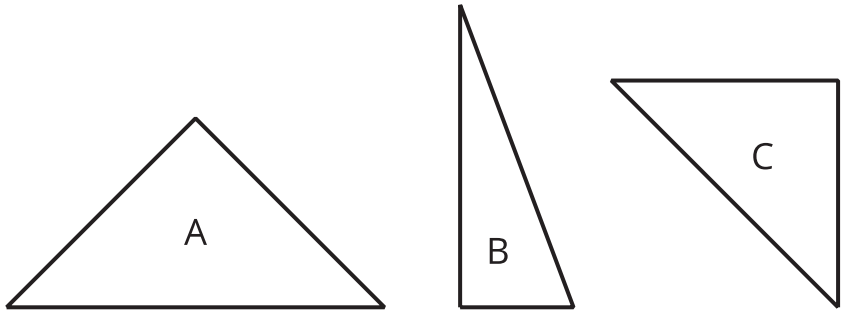




Lesson 8: Sort Triangles

Cool Down: All, Some, None of the Triangles

Complete the statements about the triangles below.



1. All of the triangles _____.

2. Some of the triangles _____.

3. None of the triangles _____.

Lesson 9: Generate Patterns

Cool Down: Patterns and Relationships

1. List the first 10 numbers for these 2 patterns.

   Jada's rule: Start with 0 and keep adding 5.

   Priya's rule: Start with 0 and keep adding 10.

2. What number will be in Priya's pattern when Jada's pattern has 100?

3. What relationship do you notice between corresponding numbers in the two patterns?

   _____

   _____

Lesson 10: Interpret Relationships

Cool Down: Jada's and Priya's Patterns

1. Jada and Priya are creating rules for patterns. Follow each rule to complete the patterns.

   Jada's rule: start with 0 and add 3.

   Priya's rule: start with 0 and add 4.

2. Kiran says that when Jada's number is 45, Priya's corresponding number will be 90. Do you agree? Why or why not?

Lesson 11: Patterns and Ordered Pairs

Cool Down: 2 Rules

1. Complete the patterns for each rule.

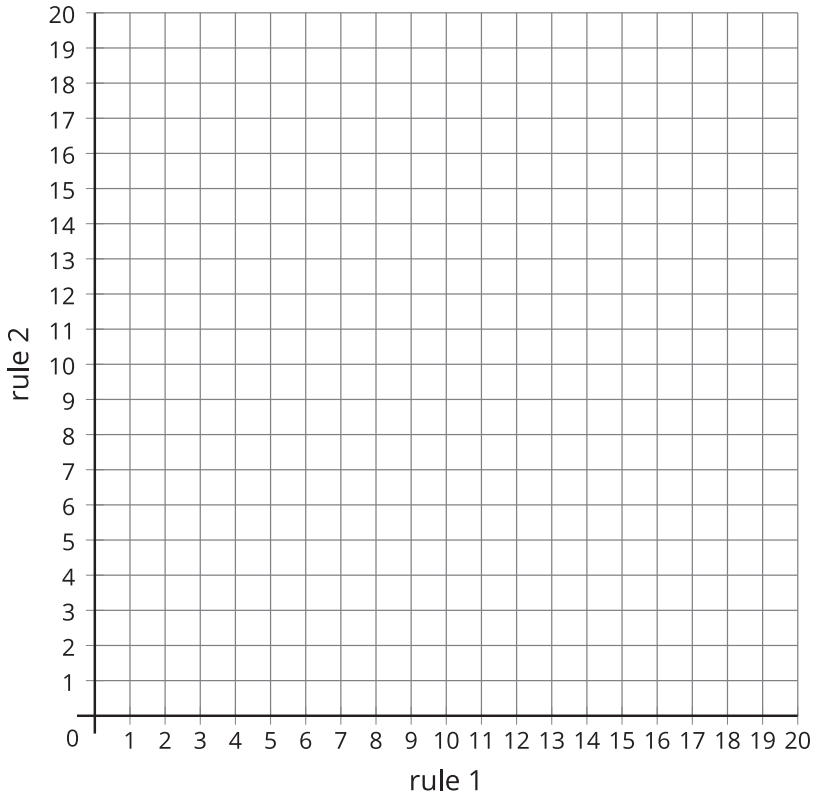
	A	B	C	D
Rule 1: Start at 0. Add 3.				
Rule 2: Start at 0. Add 6.				

2. What relationships do you notice between corresponding terms in the two patterns?

_____

_____

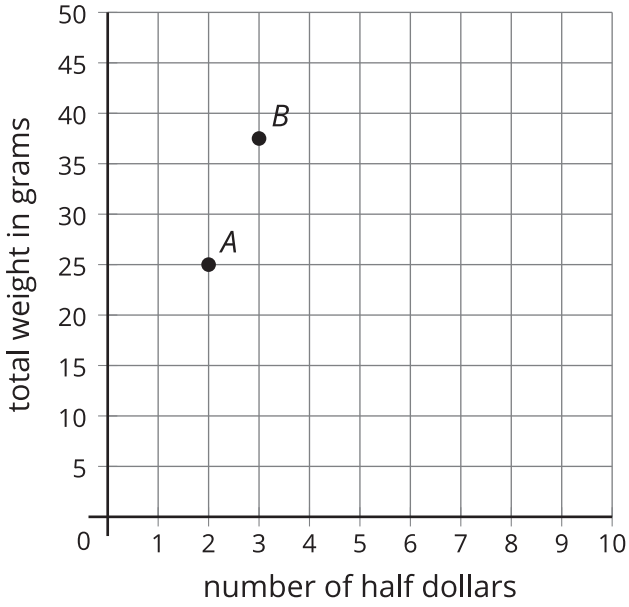
3. Plot and label the points on the coordinate grid.



Lesson 12: Represent Problems on the Coordinate Grid

Cool Down: Half Dollar

The coordinate grid shows the weight of some half dollars.

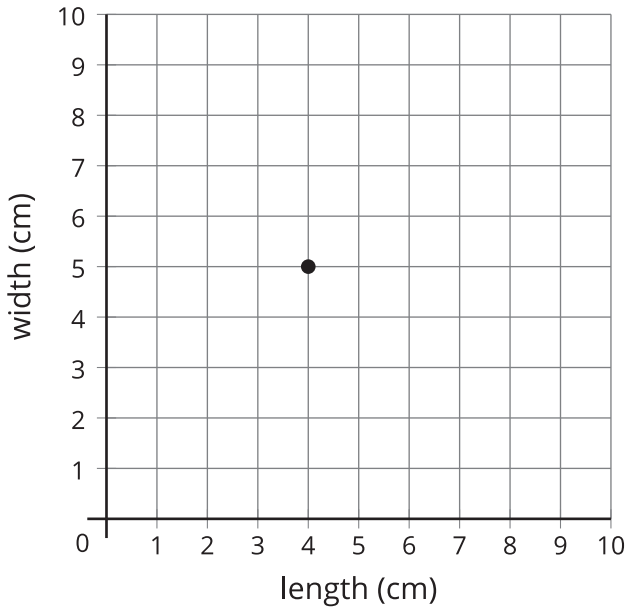


Pick one of the points and describe what it represents.

Lesson 13: Perimeter and Area of Rectangles

Cool Down: Area and Perimeter of a Rectangle

The point represents the length and width of a rectangle.



1. What are the area and perimeter of the rectangle? Explain or show your reasoning.

2. What is a point that represents a different rectangle with the same area? Explain or show your reasoning.

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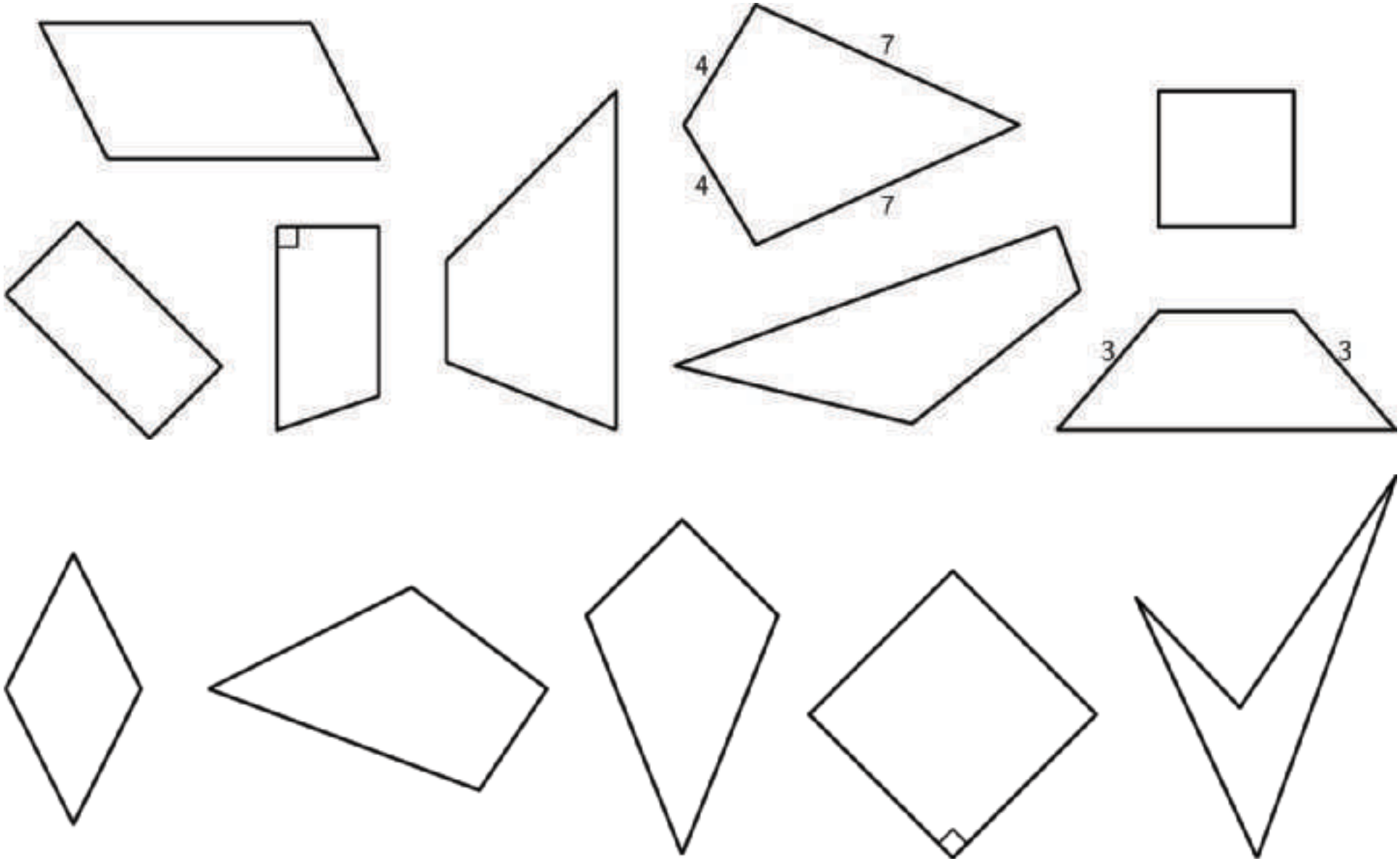
Instructional Masters

Instructional Masters for Shapes on the Coordinate Plane

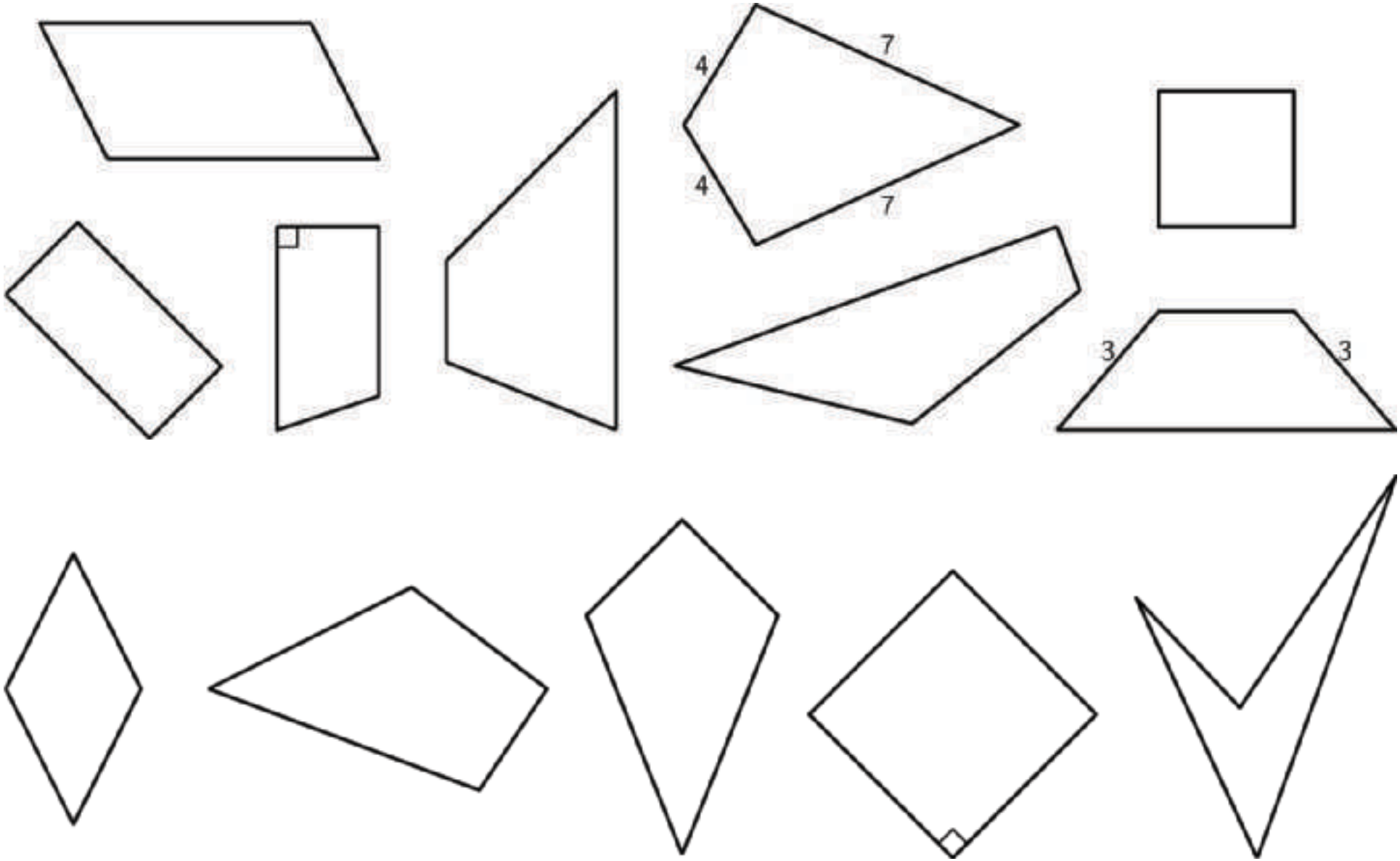
address	title	students per copy	written on?	requires cutting?	card stock recommended?	color paper recommended?
Activity Grade5.7.4.1	Guess Which One	2	no	no	no	no
Center	Guess Which One	2	no	no	no	no
Activity Grade5.7.4.2	Card Sort Quadrilaterals (Grade 5)	2	no	yes	no	no
Activity Grade5.7.2.1	What's the Point	2	no	yes	no	no
Activity Grade5.7.7.1	Quadrilateral Clues	2	no	yes	no	no
Activity Grade5.7.1.1	Can You Draw It Stage 6 Recording Sheet	1	yes	no	no	no
Center	Can You Draw It Stage 6 Recording Sheet	1	yes	no	no	no
Activity Grade5.7.1.1	Explore the Coordinate Grid Cards	1	no	yes	no	no
Center	Explore the Coordinate Grid Cards	1	no	yes	no	no
Activity Grade5.7.8.1	Card Sort Triangles (Grade 5)	2	no	yes	no	no
Center	Shape Cards Grade 4	2	no	yes	no	no
Center	Shape Cards Grade 4	2	no	yes	no	no
Center	Shape Cards Grade 4	2	no	yes	no	no
Center	Can You Draw It Stage 5 and 7 Recording Sheet	1	yes	no	no	no

Center	Can You Draw It Stage 5 and 7 Recording Sheet	1	yes	no	no	no
Center	Which One Stage 6 Gameboard	2	no	no	no	no
Center	Quadrilateral Cards Grade 5	2	no	yes	no	no
Center	Quadrilateral Cards Grade 5	2	no	yes	no	no
Center	Quadrilateral Cards Grade 5	2	no	yes	no	no
Center	Triangle Cards Grade 5	2	no	yes	no	no
Center	Triangle Cards Grade 5	2	no	yes	no	no
Center	Picture Books Stage 3 Recording Sheet	1	yes	no	no	no
Center	Can You Draw It Stage 4 Recording Sheet	1	yes	no	no	no

Guess Which One

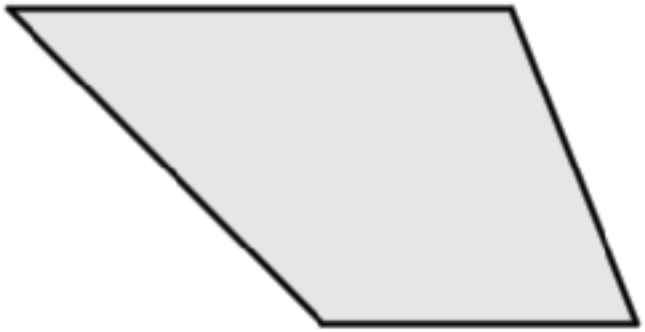


Guess Which One

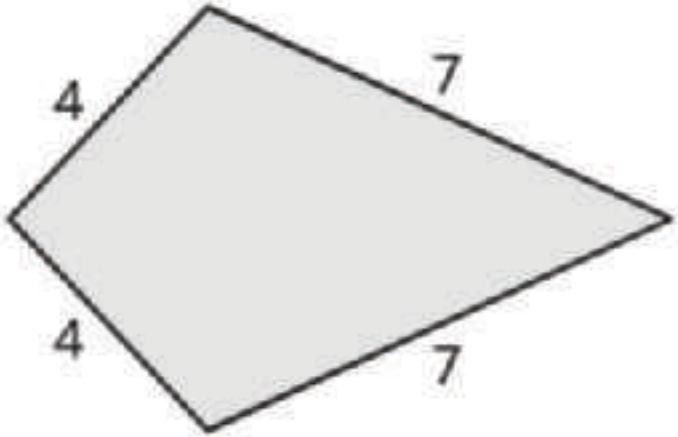


Card Sort Quadrilaterals (Grade 5)

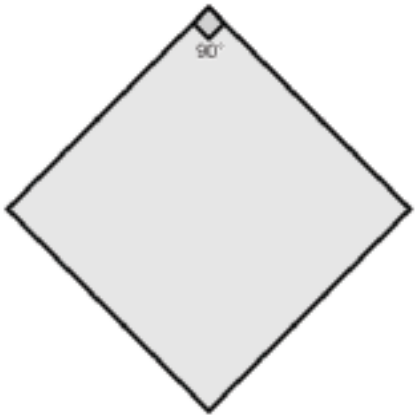
Card Sort: Quadrilaterals Grade 5



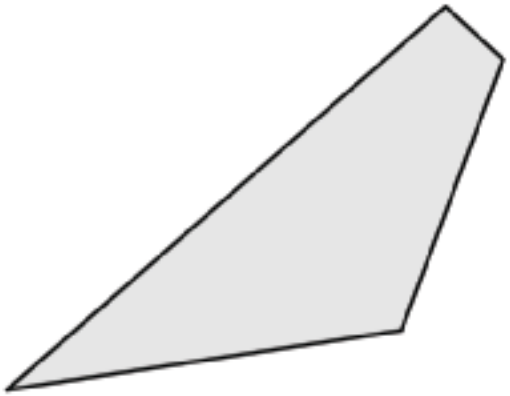
Card Sort: Quadrilaterals Grade 5



Card Sort: Quadrilaterals Grade 5

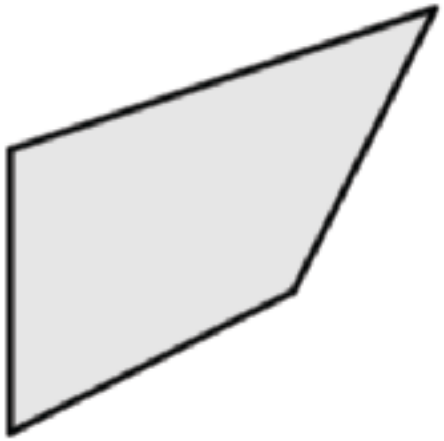


Card Sort: Quadrilaterals Grade 5



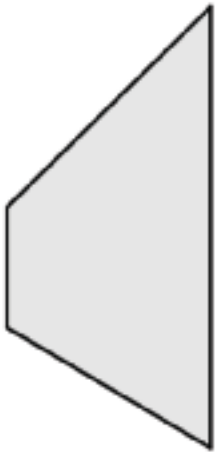
Card Sort Quadrilaterals (Grade 5)

Card Sort: Quadrilaterals Grade 5



Card Sort: Quadrilaterals Grade 5

Card Sort: Quadrilaterals Grade 5



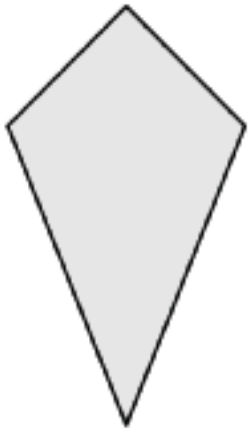
Card Sort: Quadrilaterals Grade 5

Card Sort Quadrilaterals (Grade 5)

Card Sort: Quadrilaterals Grade 5

Card Sort: Quadrilaterals Grade 5

Card Sort: Quadrilaterals Grade 5

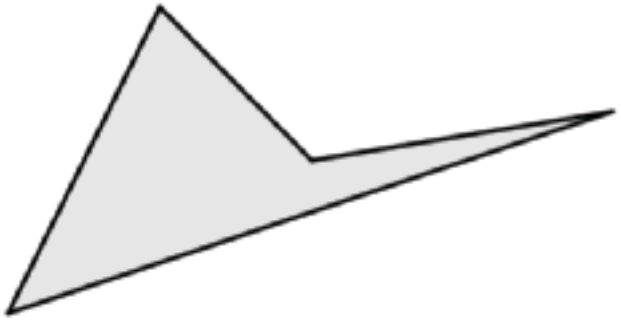


Card Sort: Quadrilaterals Grade 5

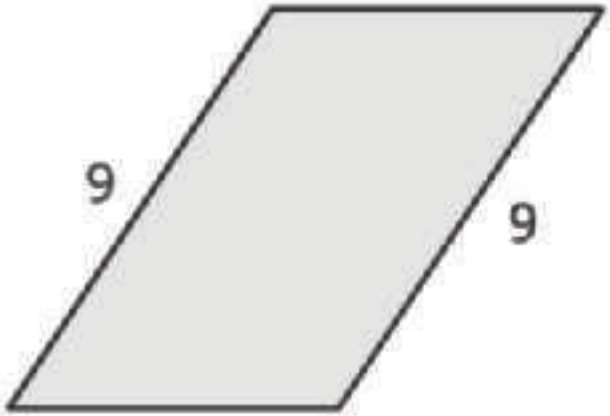
Card Sort Quadrilaterals (Grade 5)

Card Sort: Quadrilaterals Grade 5

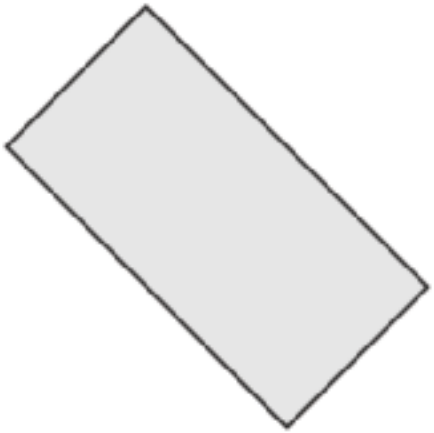
Card Sort: Quadrilaterals Grade 5



Card Sort: Quadrilaterals Grade 5



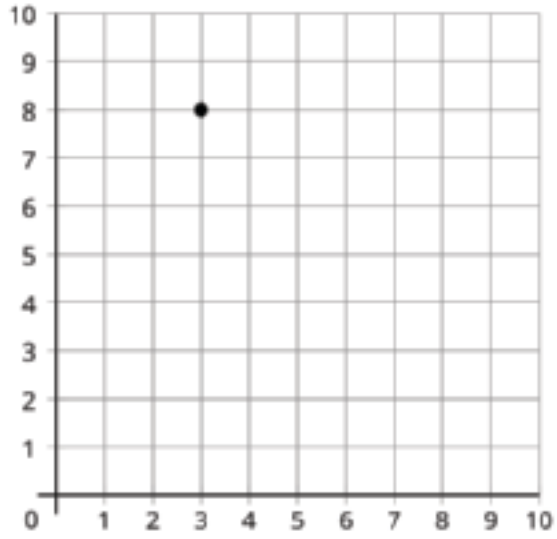
Card Sort: Quadrilaterals Grade 5



What’s the Point

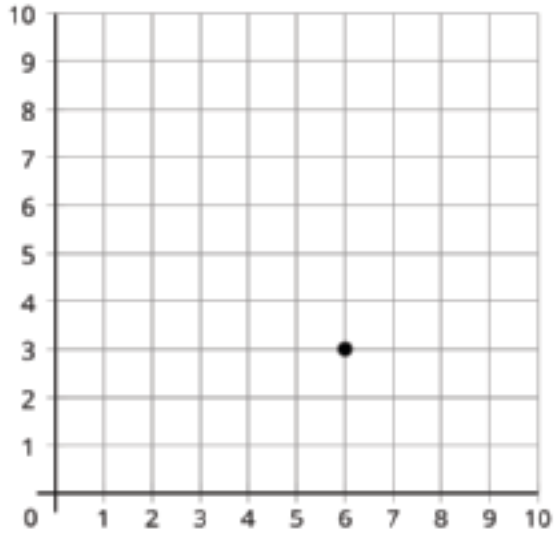
What’s the Point?

A



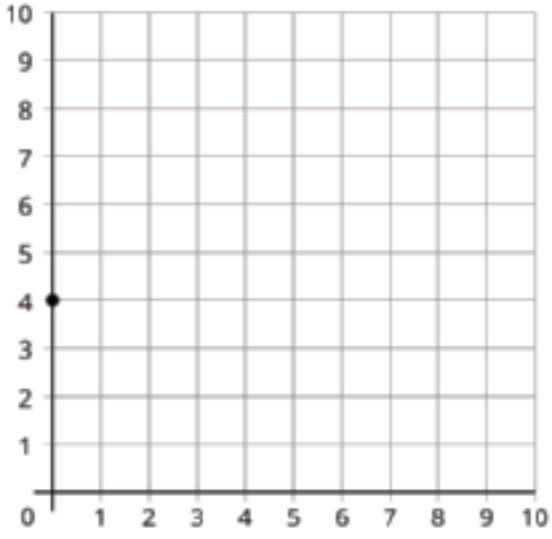
What’s the Point?

B



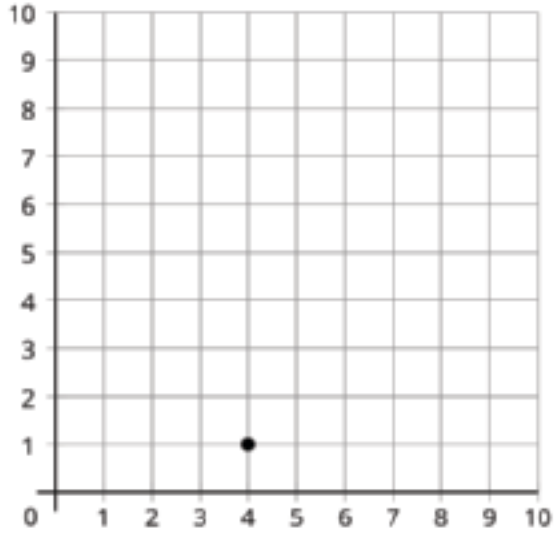
What’s the Point?

C



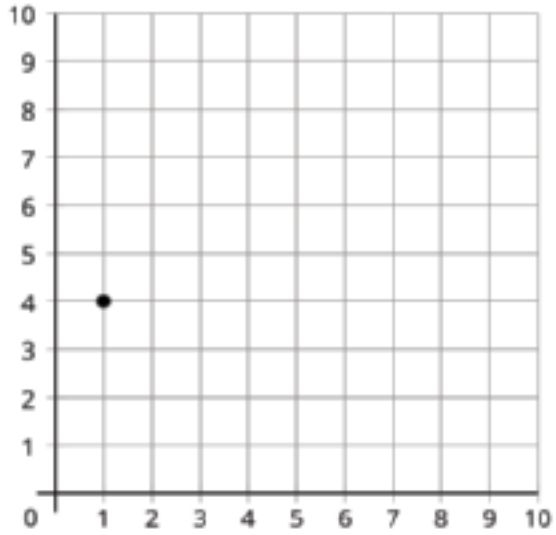
What’s the Point?

D



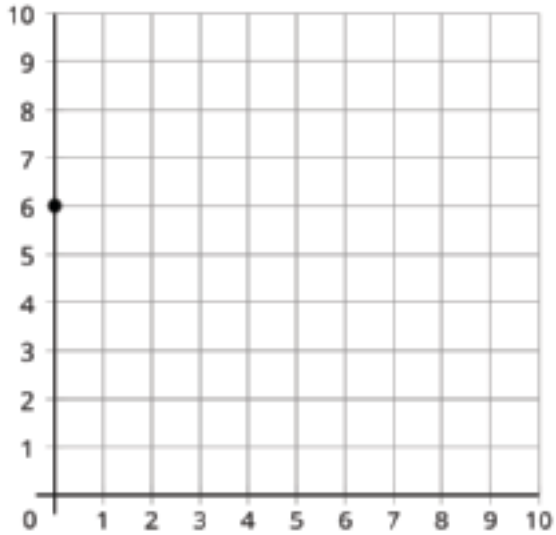
What’s the Point?

E



What’s the Point?

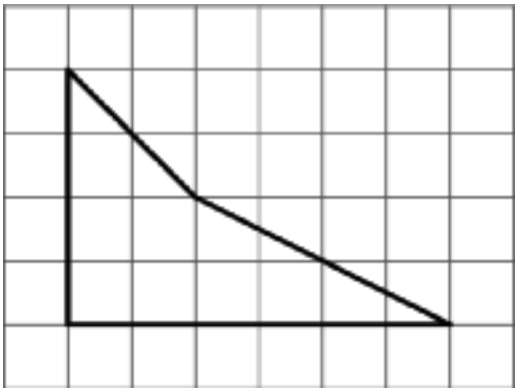
F



Quadrilateral Clues

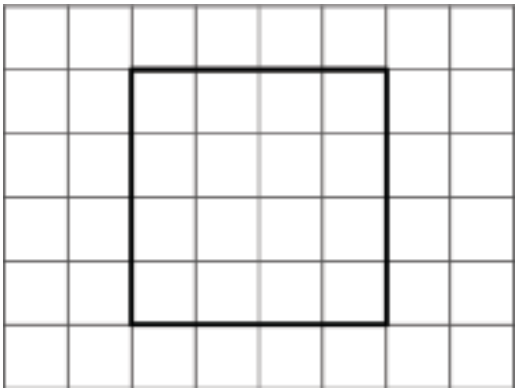
Quadrilateral Clues

A



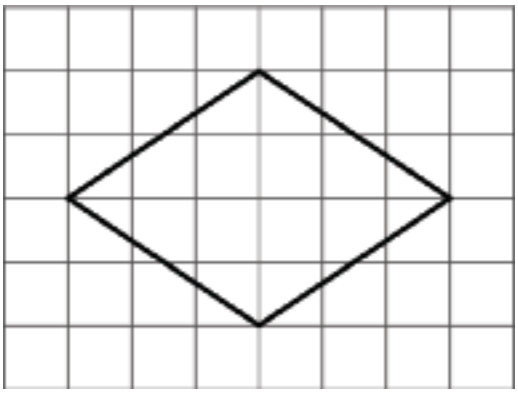
Quadrilateral Clues

B



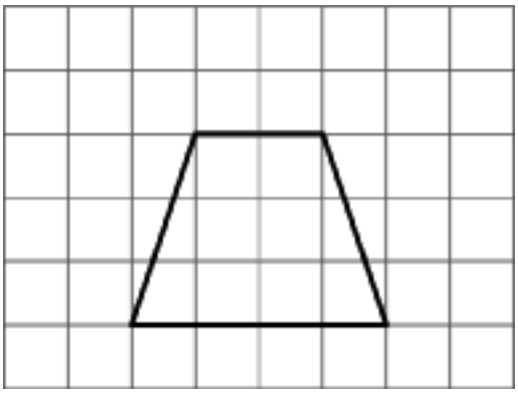
Quadrilateral Clues

C



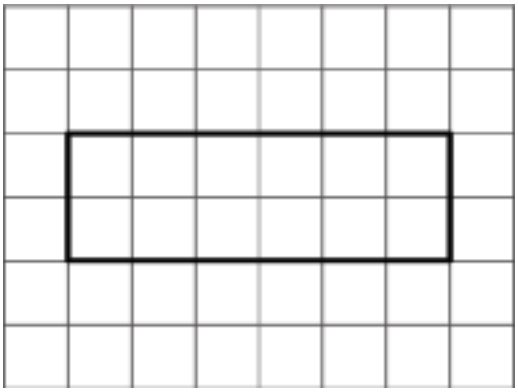
Quadrilateral Clues

D



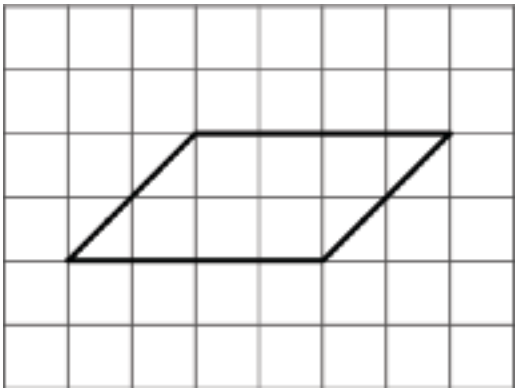
Quadrilateral Clues

E



Quadrilateral Clues

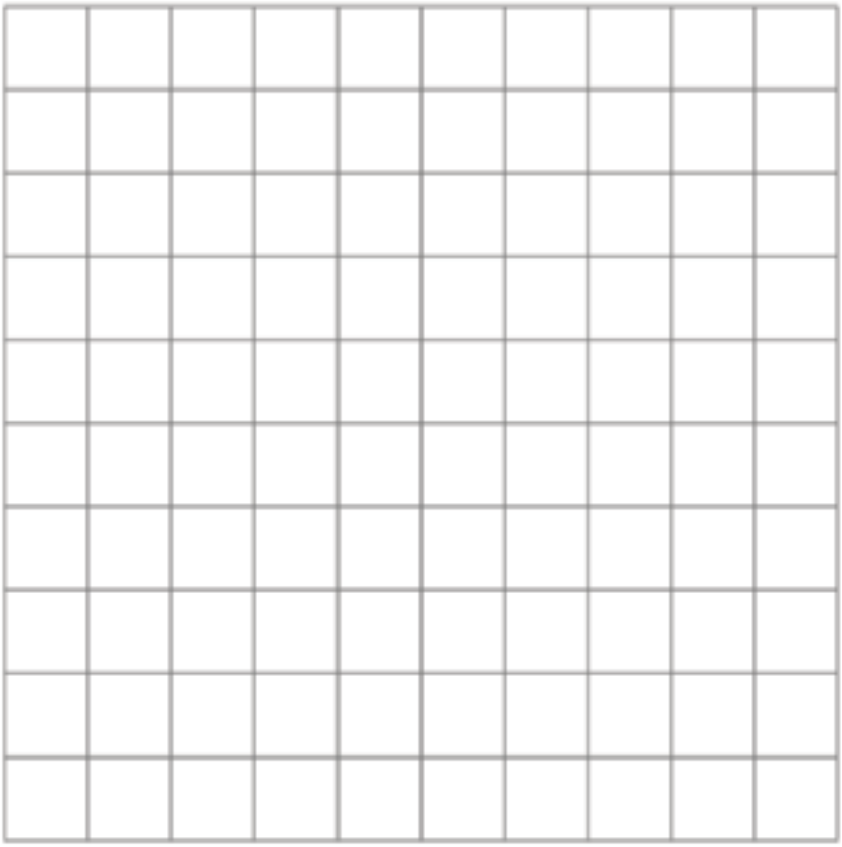
F



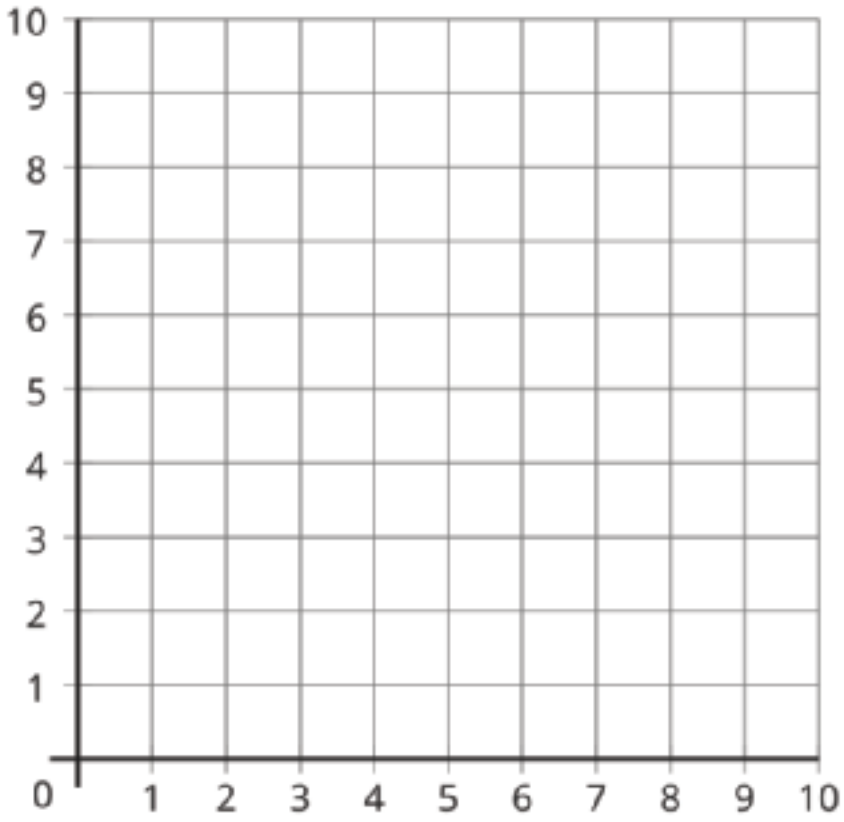
Can You Draw It Stage 6 Recording Sheet

Directions:

- Partner A: Pick a card. Describe the rectangle to Partner B.
- Partner B:
  - Draw the rectangle your partner described.
  - Earn 2 points if your rectangle matches the card Partner A described exactly.
  - Earn 1 point if it doesn't match exactly, but matches the clue given
- Take turns. The partner with the highest score at the end of 8 rounds wins.

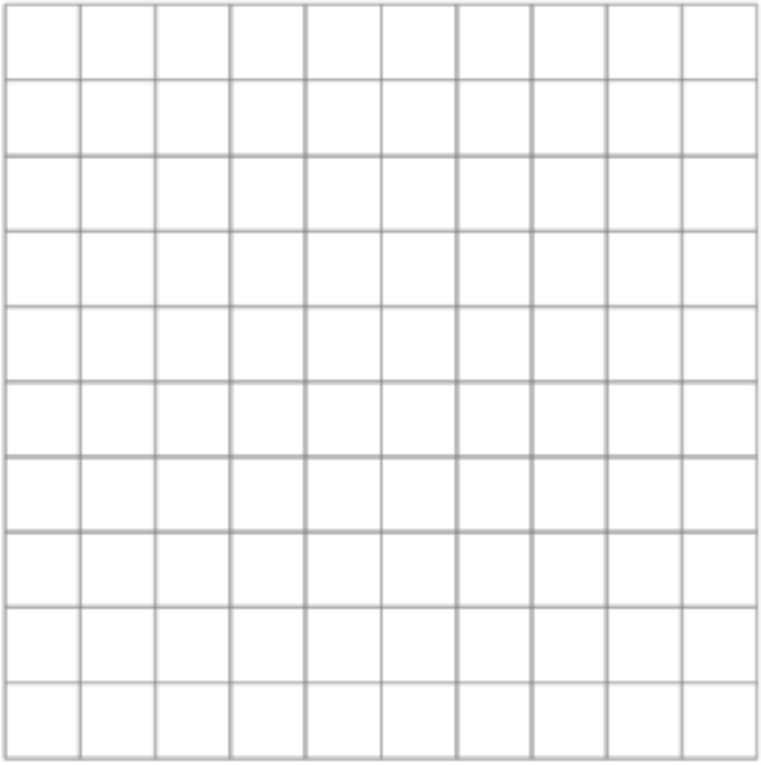
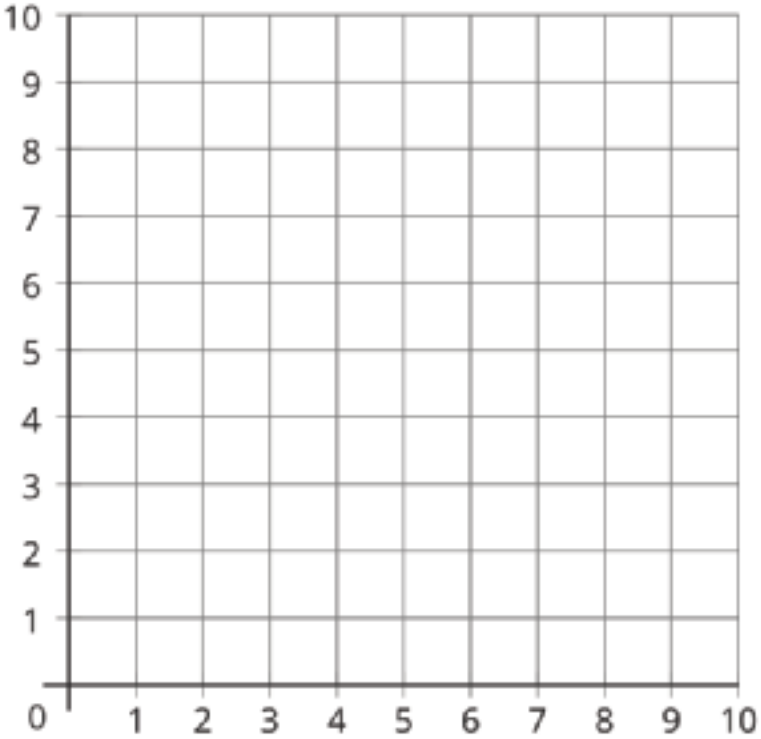
round	drawing	points
1		
2		

Can You Draw It Stage 6 Recording Sheet

3		

round	drawing	points
1		

Can You Draw It Stage 6 Recording Sheet

2		
3		

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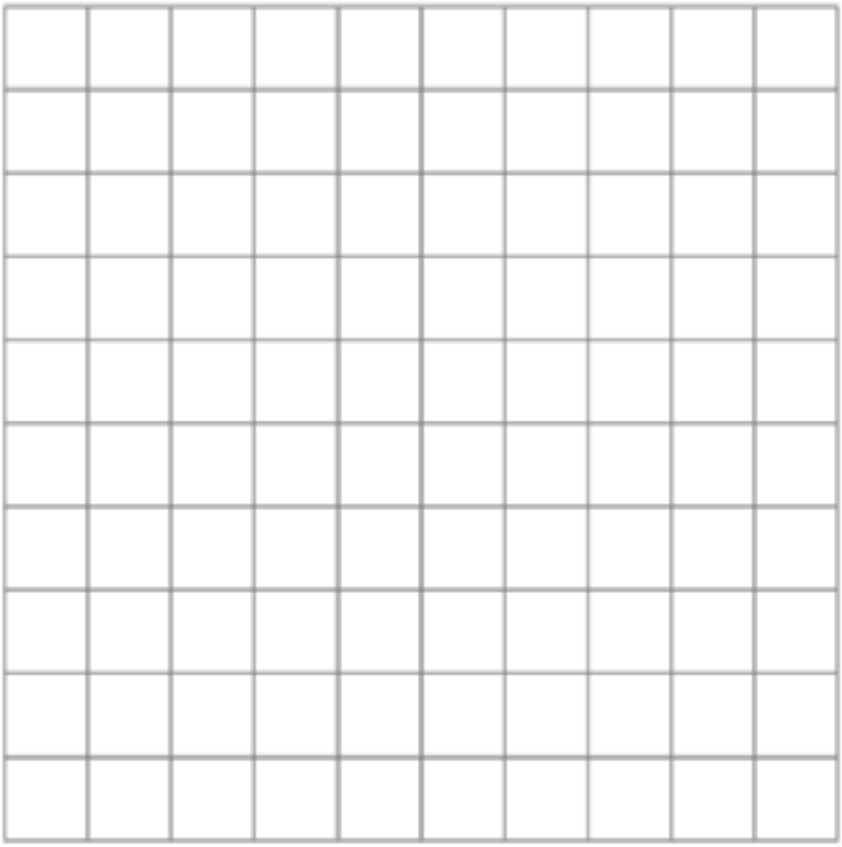
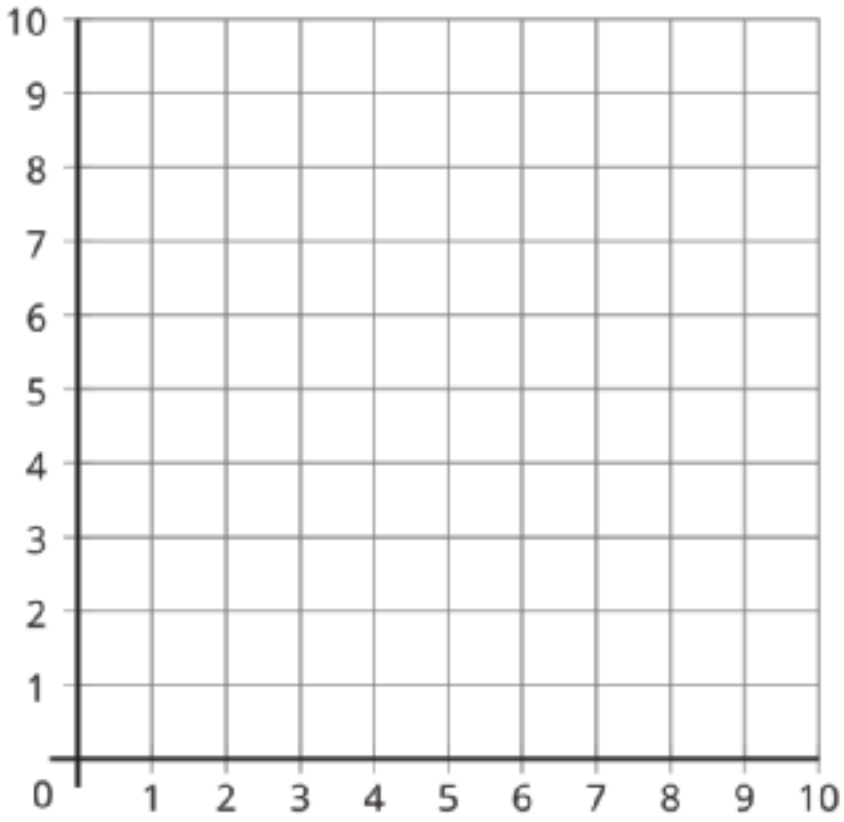
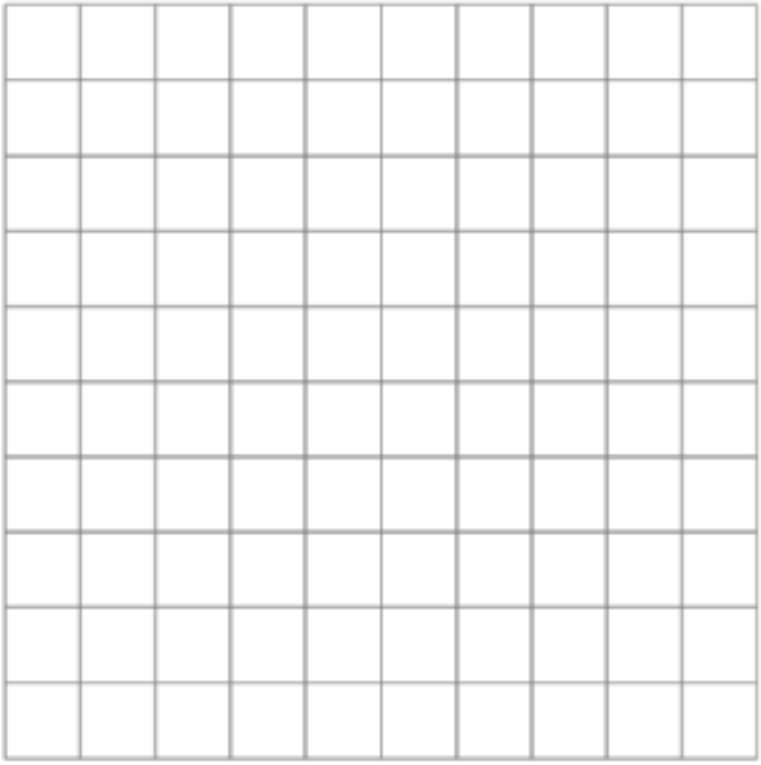
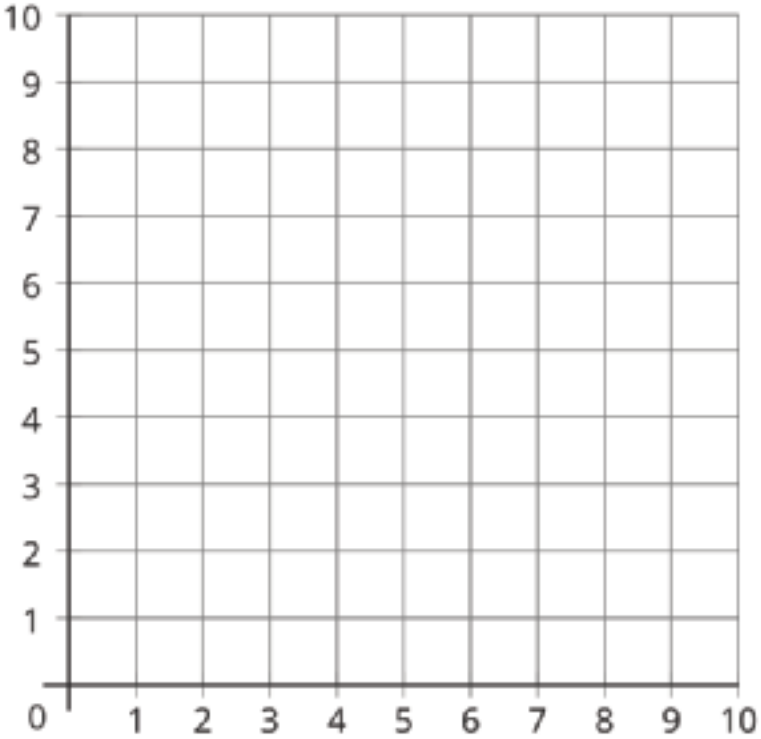
1		
2		

Can You Draw It Stage 6 Recording Sheet

3		

round	drawing	points
1		

Can You Draw It Stage 6 Recording Sheet

2		
3		

Explore the Coordinate Grid Cards

Explore the Coordinate Grid

Explore the Coordinate Grid

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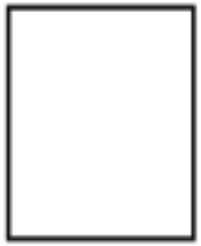
Explore the Coordinate Grid



Explore the Coordinate Grid Cards

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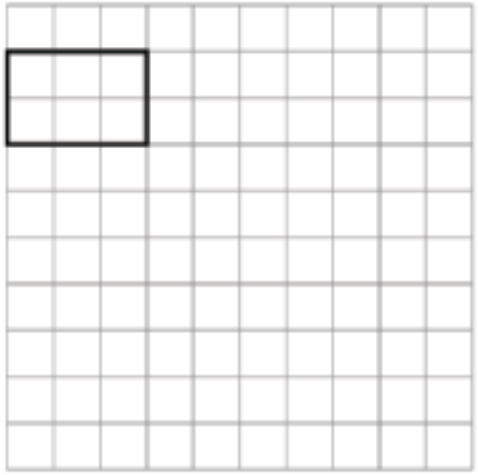

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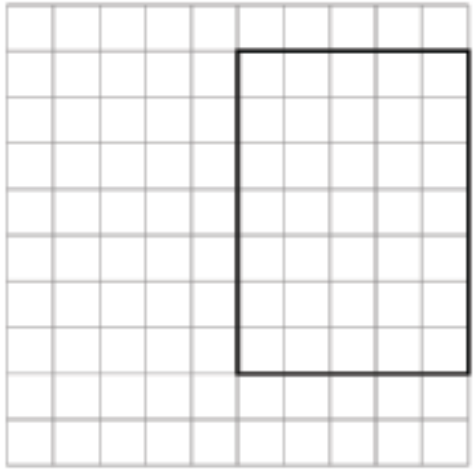

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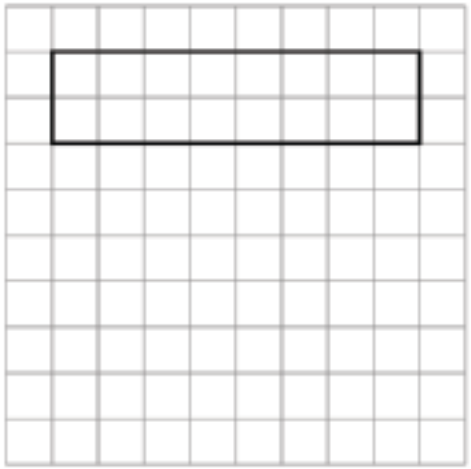
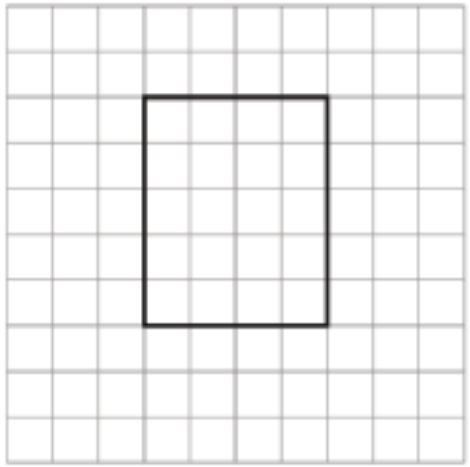


Explore the Coordinate Grid



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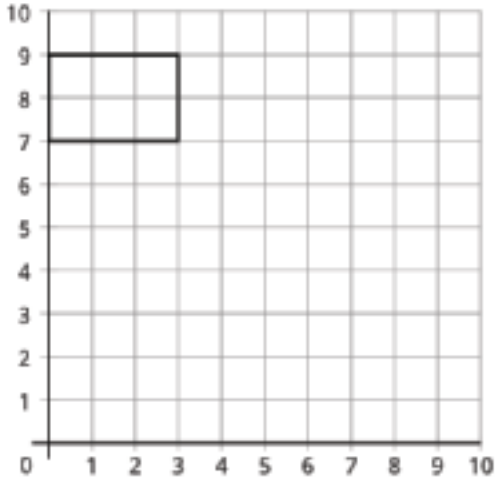

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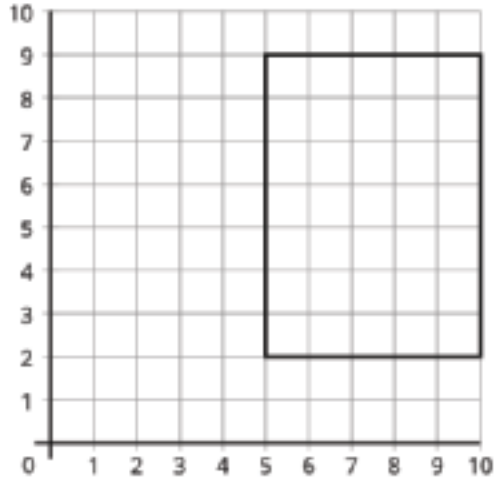

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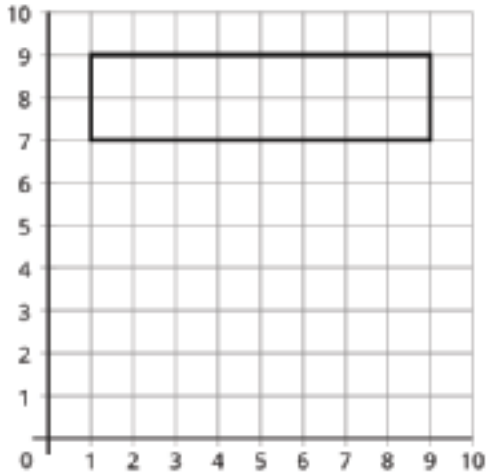

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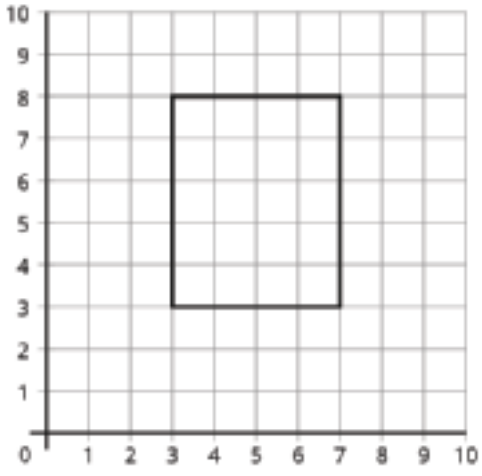

Explore the Coordinate Grid Cards

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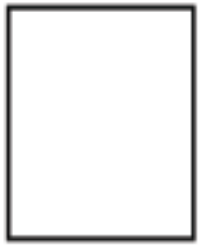

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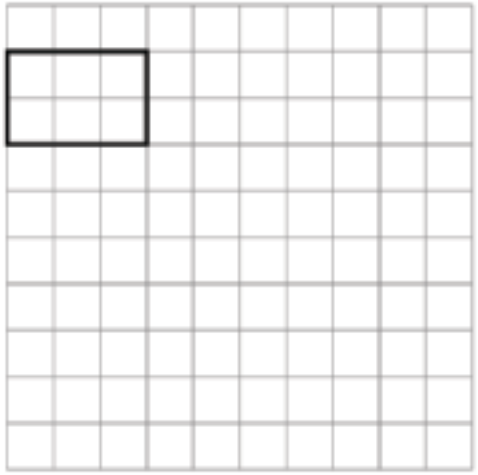

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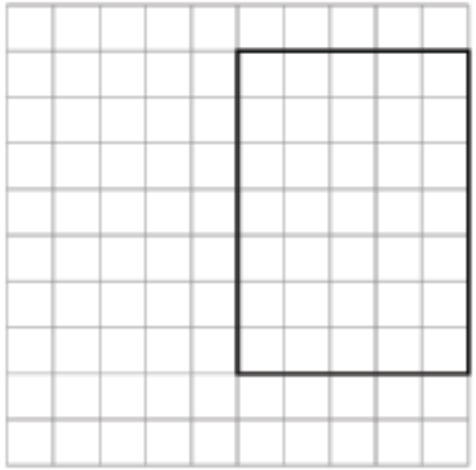

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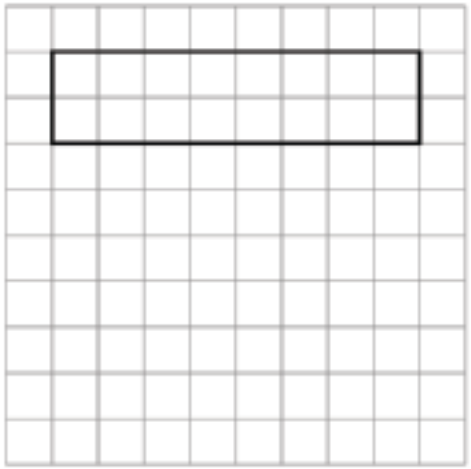

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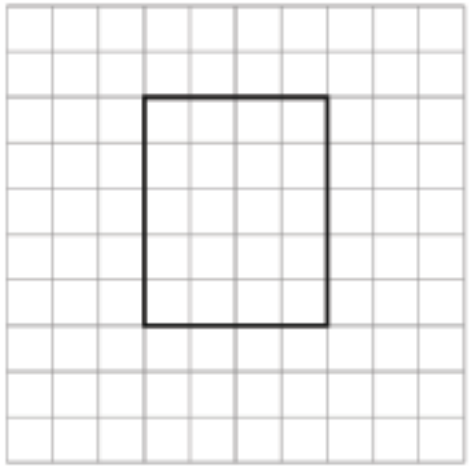

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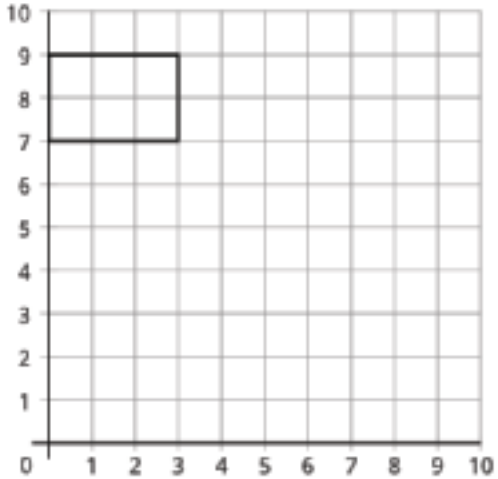

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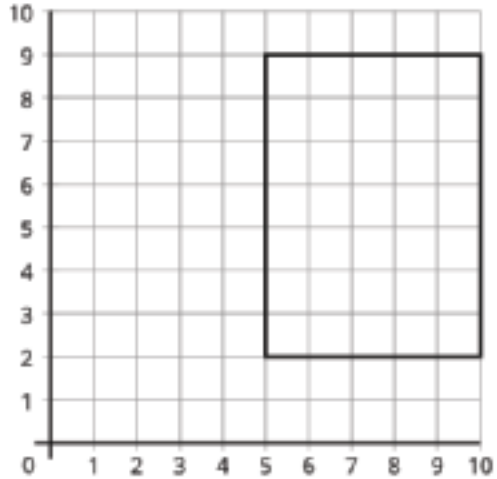

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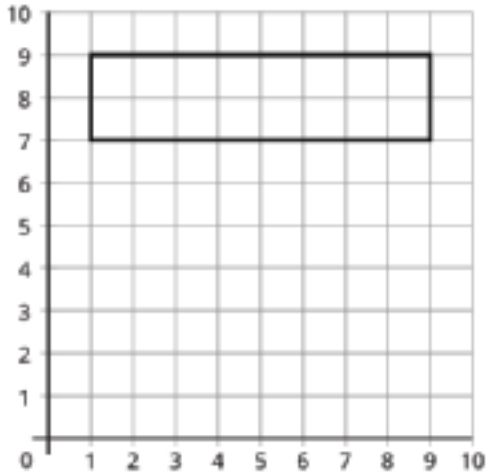

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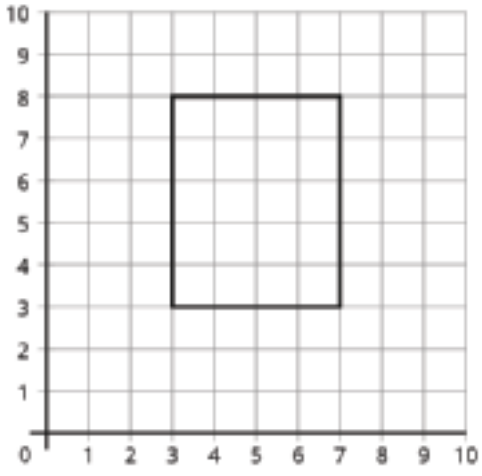
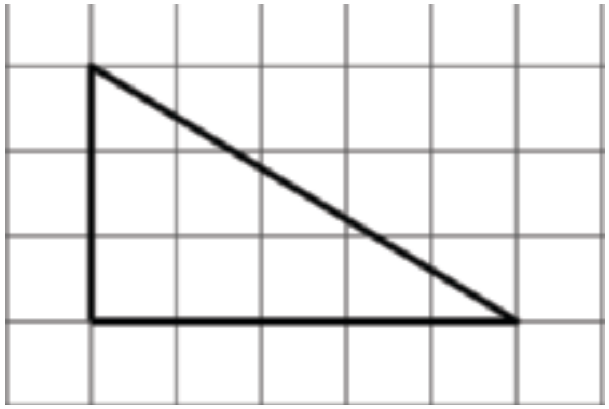


Card Sort Triangles (Grade 5)

Card Sort: Triangles Grade 5

A

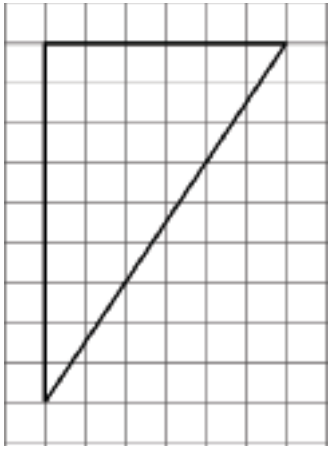


Card Sort: Triangles Grade 5

B

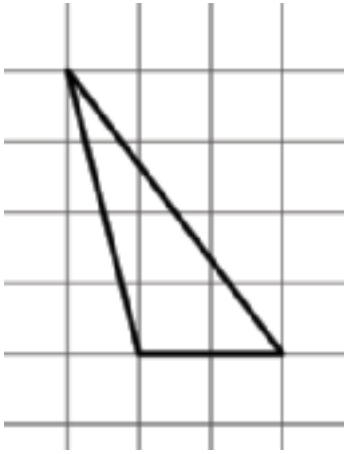
Card Sort: Triangles Grade 5

C



Card Sort: Triangles Grade 5

D



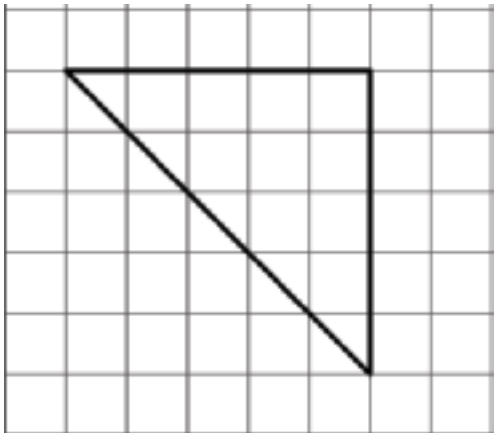
Card Sort Triangles (Grade 5)

Card Sort: Triangles Grade 5

E

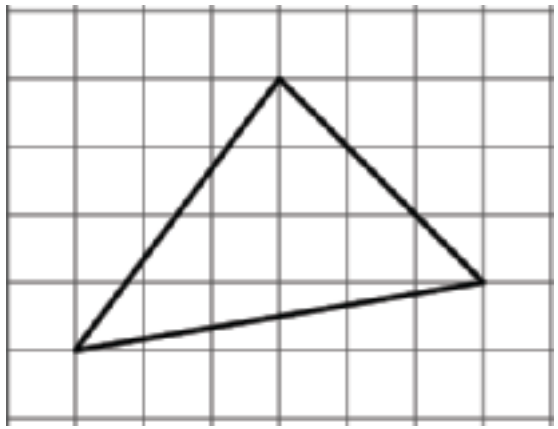
Card Sort: Triangles Grade 5

F



Card Sort: Triangles Grade 5

G



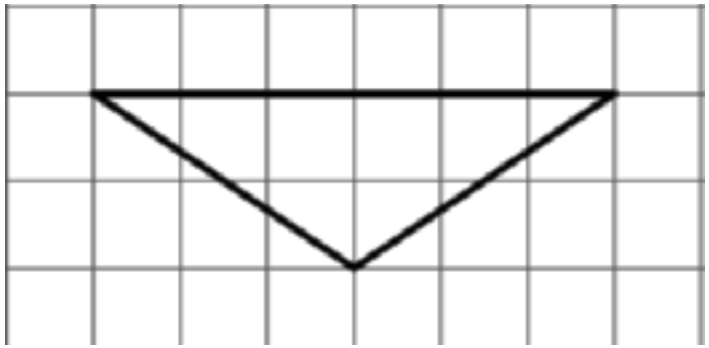
Card Sort: Triangles Grade 5

H

Card Sort Triangles (Grade 5)

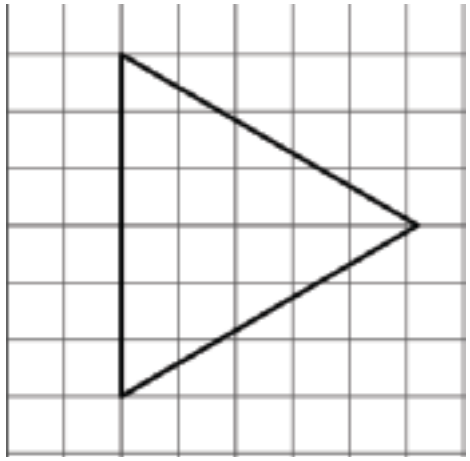
Card Sort: Triangles Grade 5

I



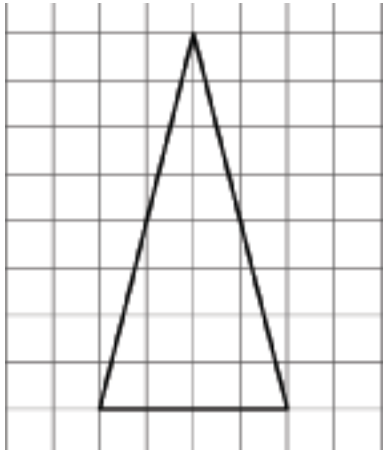
Card Sort: Triangles Grade 5

J



Card Sort: Triangles Grade 5

K



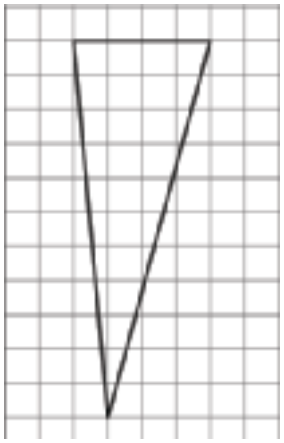
Card Sort: Triangles Grade 5

L

Card Sort Triangles (Grade 5)

Card Sort: Triangles Grade 5

M



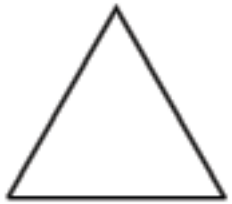
Card Sort: Triangles Grade 5

Card Sort: Triangles Grade 5

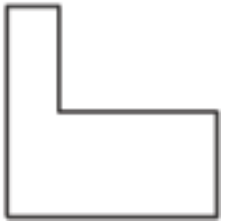
Card Sort: Triangles Grade 5

Shape Cards Grade 4

Shape Cards Grade 4
A

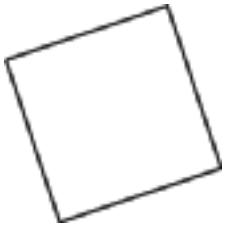


Shape Cards Grade 4
B



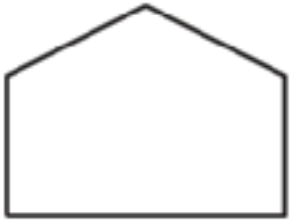
Shape Cards Grade 4
C

Shape Cards Grade 4
D



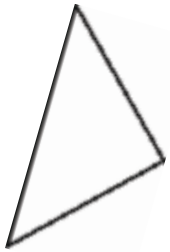
Shape Cards Grade 4
E

Shape Cards Grade 4
F



Shape Cards Grade 4
G

Shape Cards Grade 4
H



Shape Cards Grade 4
I

Shape Cards Grade 4

Shape Cards Grade 4
J

Shape Cards Grade 4
K

Shape Cards Grade 4
L

Shape Cards Grade 4
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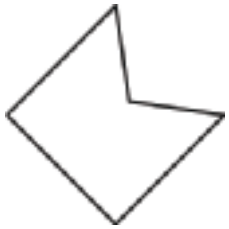

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Shape Cards Grade 4
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Shape Cards Grade 4
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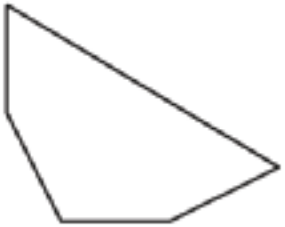

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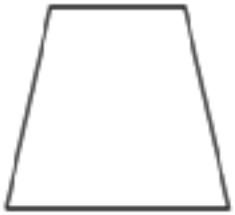

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Shape Cards Grade 4

Shape Cards Grade 4
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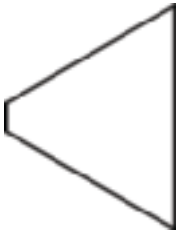

Shape Cards Grade 4
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Shape Cards Grade 4
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Shape Cards Grade 4
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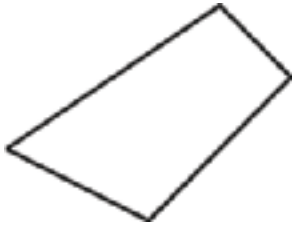

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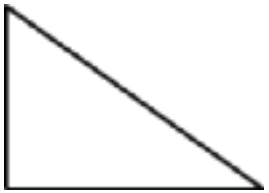

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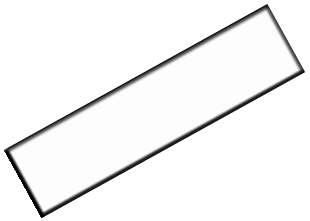

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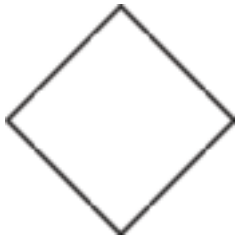

Shape Cards Grade 4

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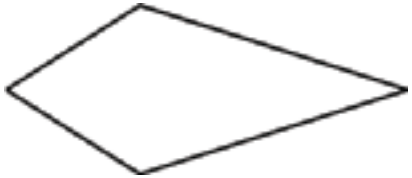

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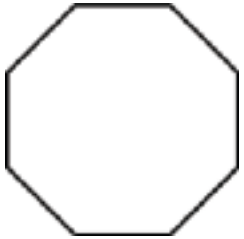

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Shape Cards Grade 4
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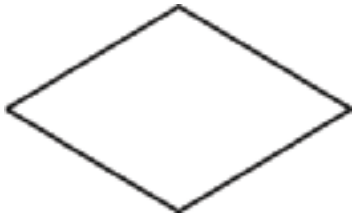

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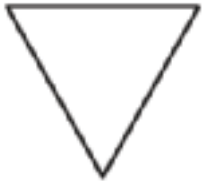

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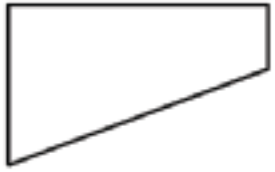

Shape Cards Grade 4
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Shape Cards Grade 4
II

Shape Cards Grade 4
JJ

Shape Cards Grade 4

Shape Cards Grade 4
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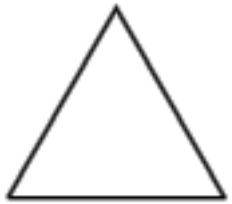

Shape Cards Grade 4
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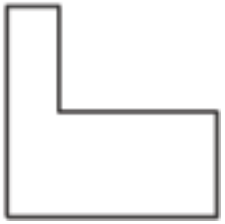

Shape Cards Grade 4
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Shape Cards Grade 4
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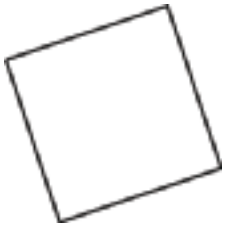

Shape Cards Grade 4
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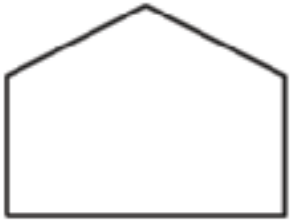

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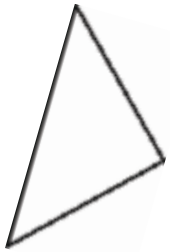

Shape Cards Grade 4
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Shape Cards Grade 4

Shape Cards Grade 4
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Shape Cards Grade 4
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Shape Cards Grade 4
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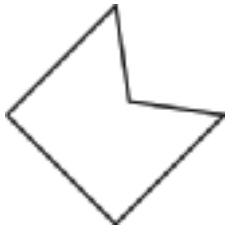

Shape Cards Grade 4
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Shape Cards Grade 4
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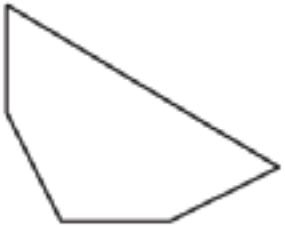

Shape Cards Grade 4
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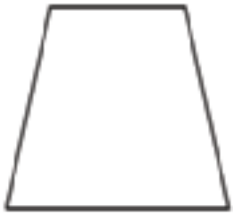

Shape Cards Grade 4
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Shape Cards Grade 4

Shape Cards Grade 4
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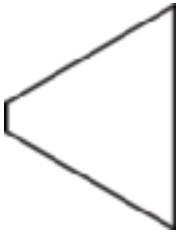

Shape Cards Grade 4
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Shape Cards Grade 4
V

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W

Shape Cards Grade 4
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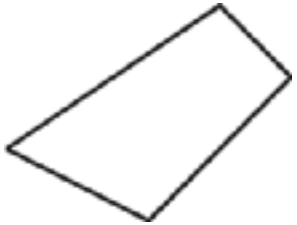

Shape Cards Grade 4
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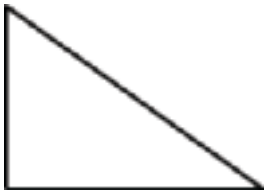

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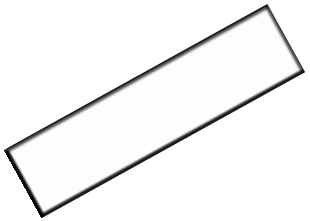

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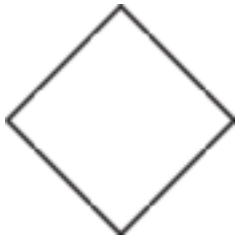

Shape Cards Grade 4

Shape Cards Grade 4
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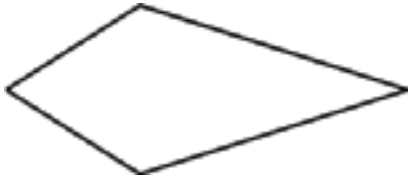

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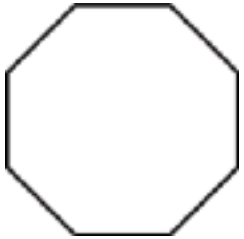

Shape Cards Grade 4
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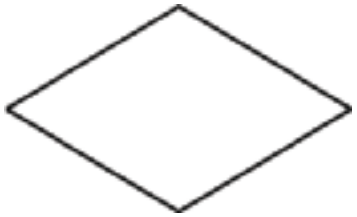
Shape Cards Grade 4
EE



Shape Cards Grade 4
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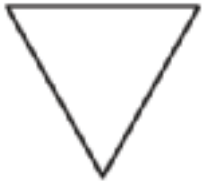

Shape Cards Grade 4
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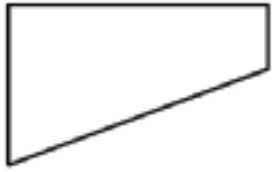

Shape Cards Grade 4
HH

Shape Cards Grade 4
II

Shape Cards Grade 4
JJ

Shape Cards Grade 4

Shape Cards Grade 4
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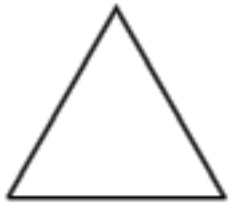

Shape Cards Grade 4
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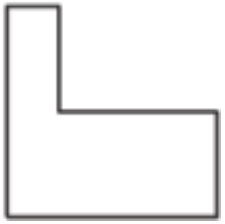

Shape Cards Grade 4
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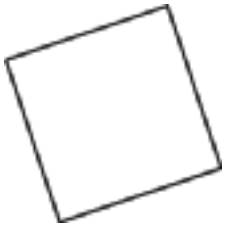

Shape Cards Grade 4
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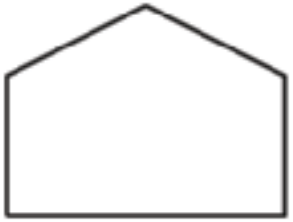

Shape Cards Grade 4
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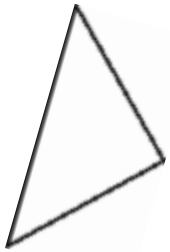

Shape Cards Grade 4
I

Shape Cards Grade 4

Shape Cards Grade 4
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Shape Cards Grade 4
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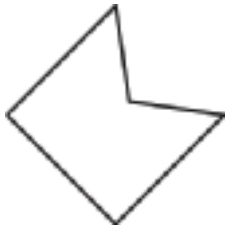

Shape Cards Grade 4
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Shape Cards Grade 4
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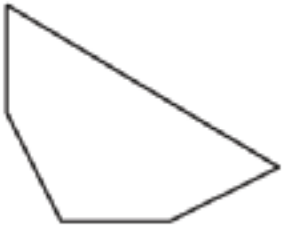

Shape Cards Grade 4
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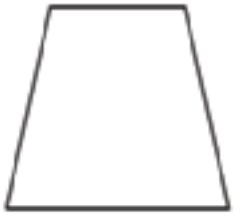

Shape Cards Grade 4
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Shape Cards Grade 4

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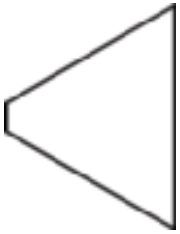

Shape Cards Grade 4
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Shape Cards Grade 4
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Shape Cards Grade 4
V

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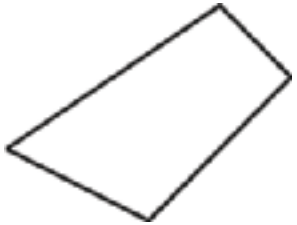

Shape Cards Grade 4
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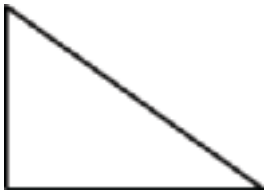

Shape Cards Grade 4
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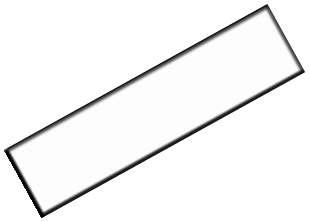

Shape Cards Grade 4
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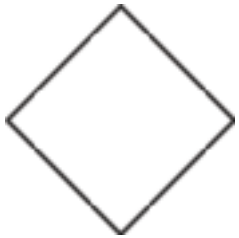

Shape Cards Grade 4

Shape Cards Grade 4
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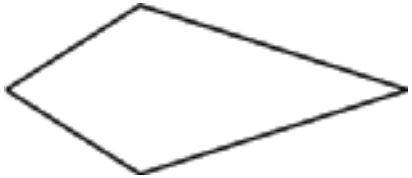

Shape Cards Grade 4
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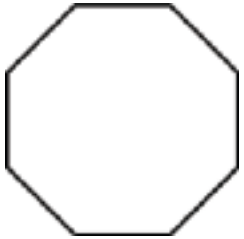

Shape Cards Grade 4
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Shape Cards Grade 4
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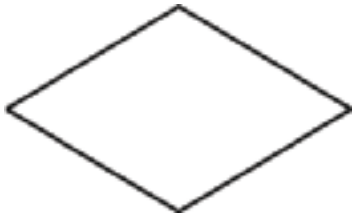

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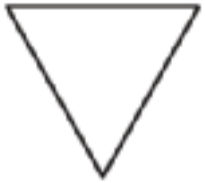

Shape Cards Grade 4
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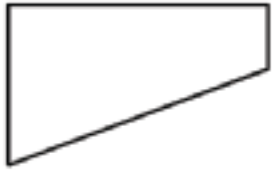


Shape Cards Grade 4
HH

Shape Cards Grade 4
II

Shape Cards Grade 4
JJ

Can You Draw It Stage 5 and 7 Recording Sheet

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.

round	drawing
1	
2	
3	
4	

Can You Draw It Stage 5 and 7 Recording Sheet

5	
6	
7	
8	

Can You Draw It Stage 5 and 7 Recording Sheet

Directions:

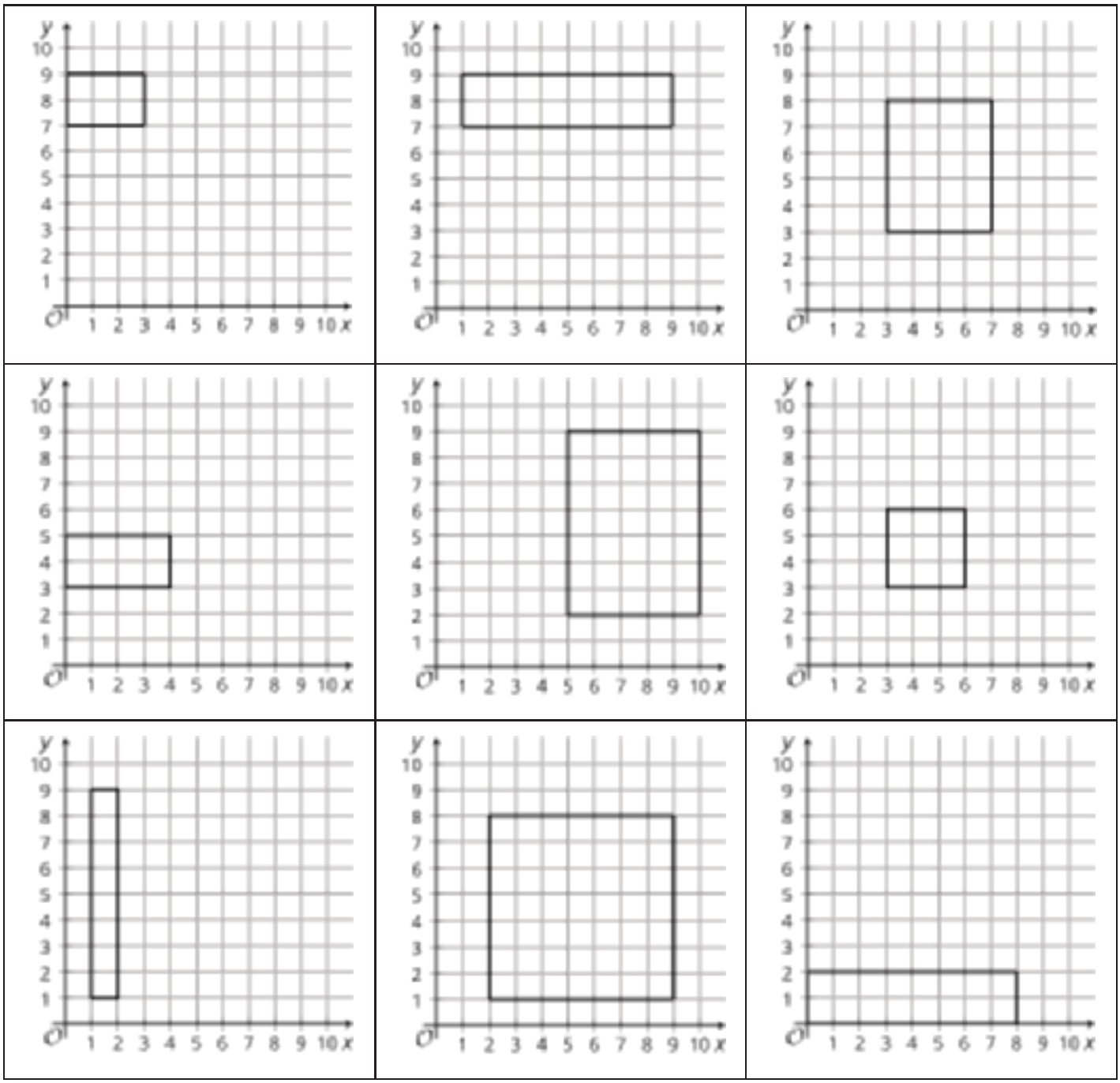
- Partner A: Choose a shape card and describe the shape to your partner.
- Partner B: Draw the shape you think is on your partner's card.
- Compare the shapes. If Partner B drew the shape correctly, they keep the card.
- Take turns. The partner with the most cards at the end of the game wins.

round	drawing
1	
2	
3	
4	

Can You Draw It Stage 5 and 7 Recording Sheet

5	
6	
7	
8	

Which One Stage 6 Gameboard



Quadrilateral Cards Grade 5

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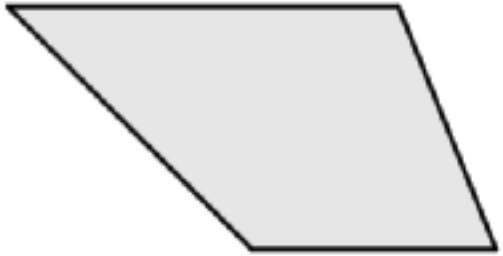

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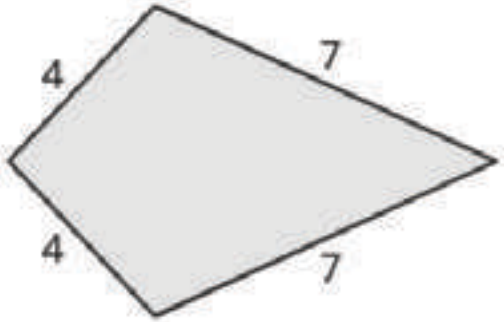

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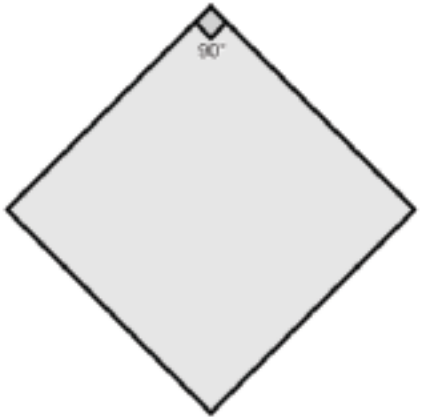

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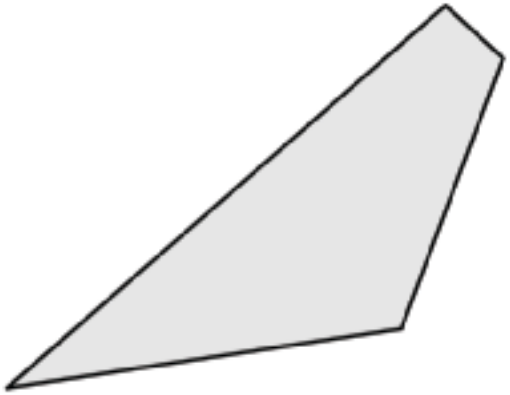

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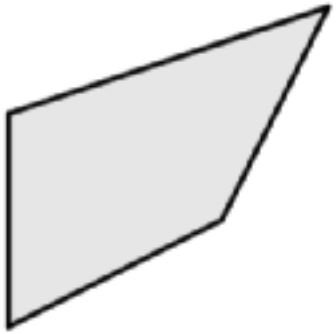

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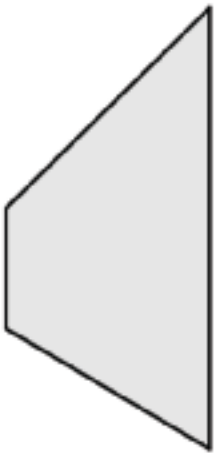

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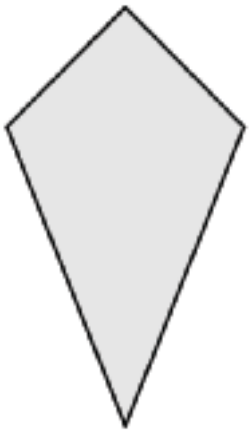

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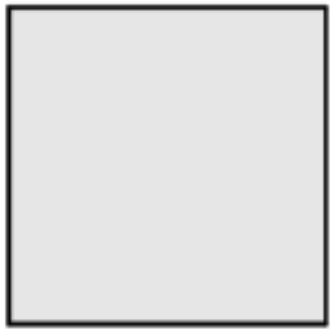

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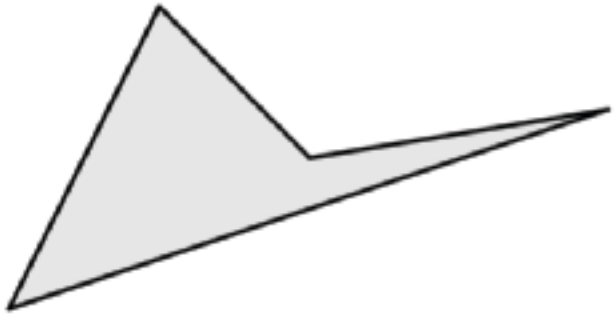

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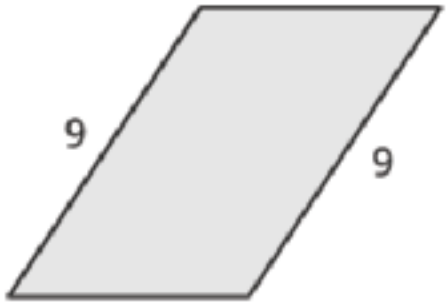

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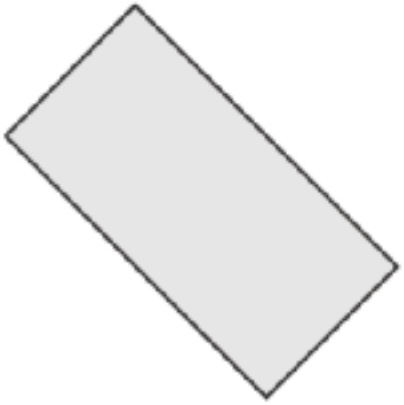

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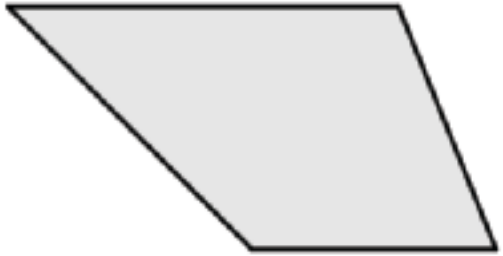

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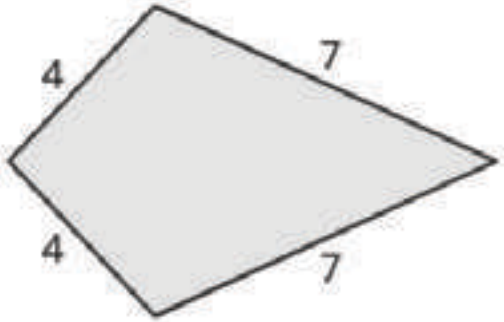

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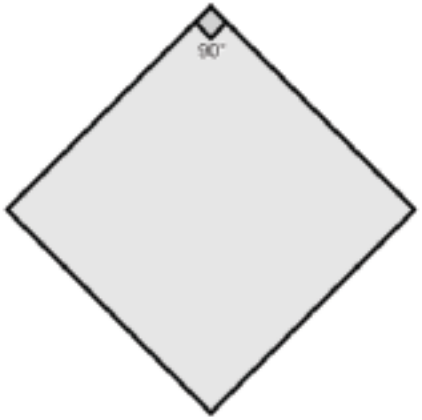

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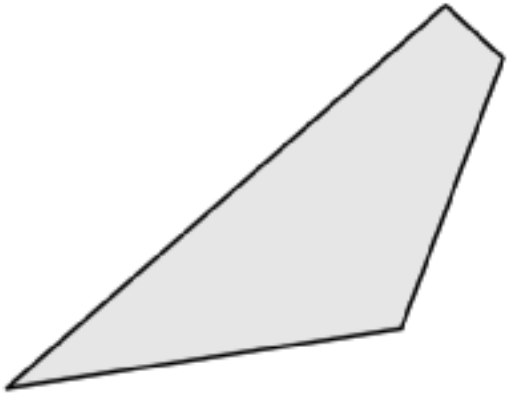

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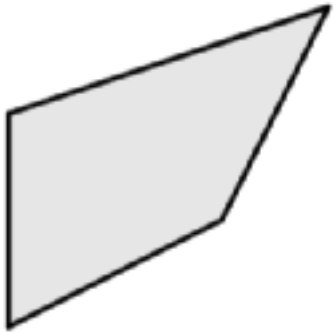

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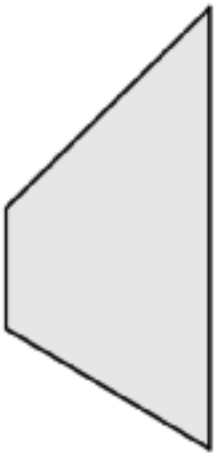

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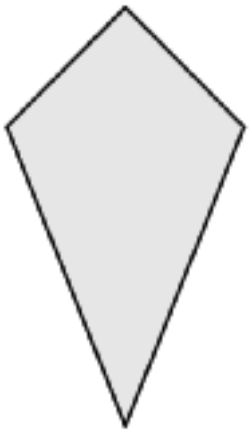

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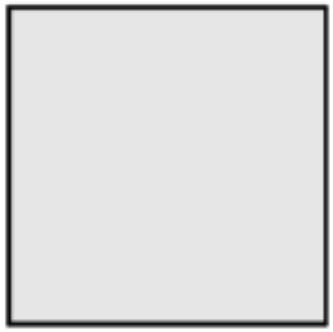

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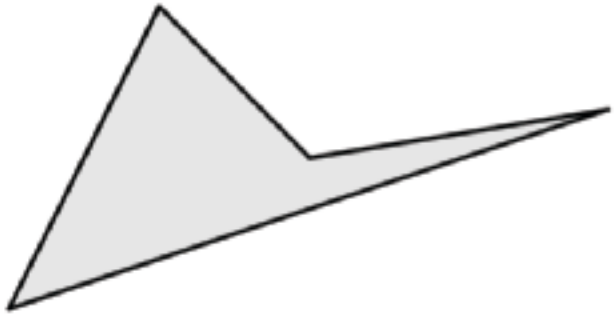

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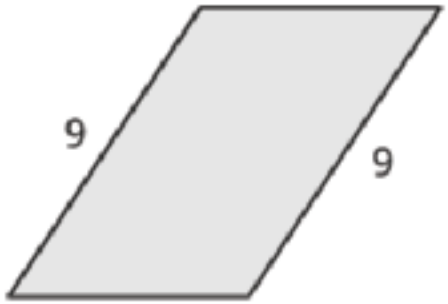

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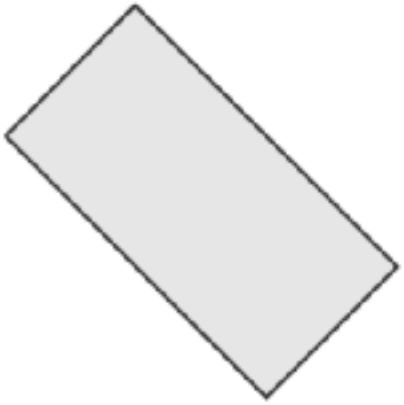

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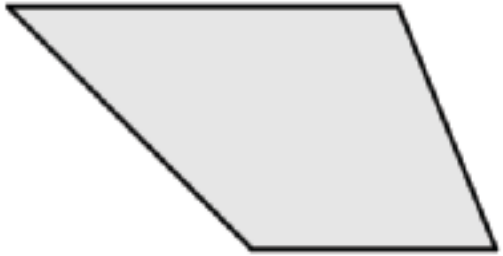

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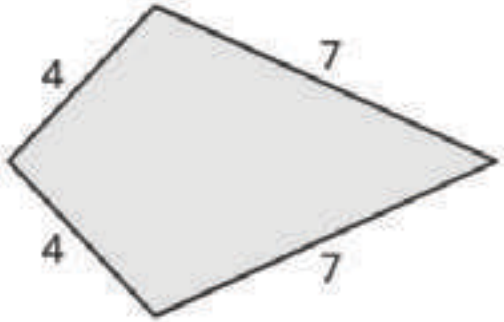

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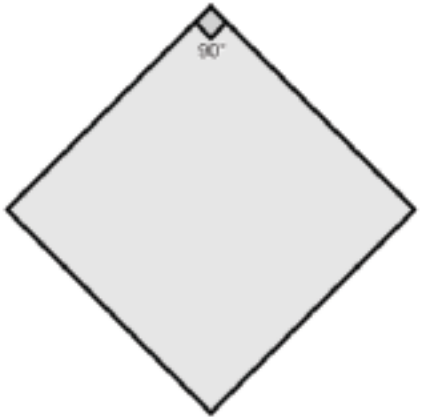

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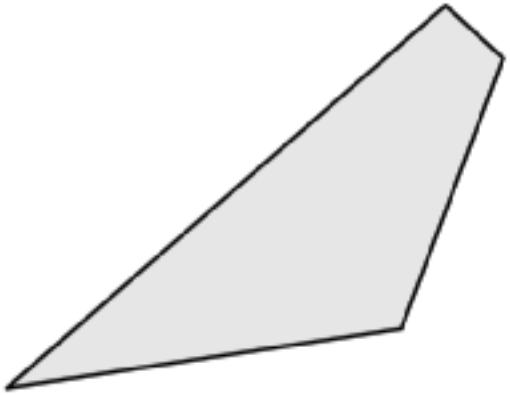

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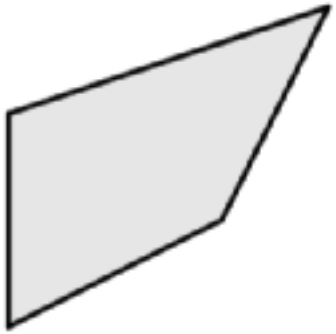

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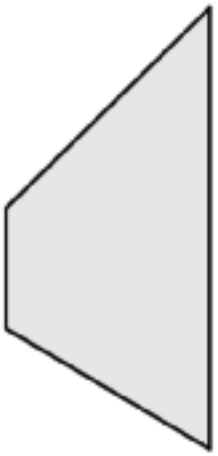

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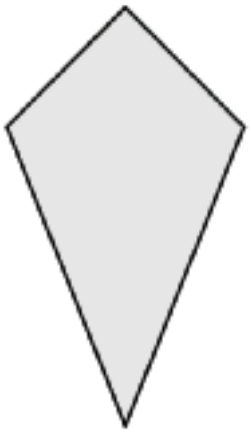

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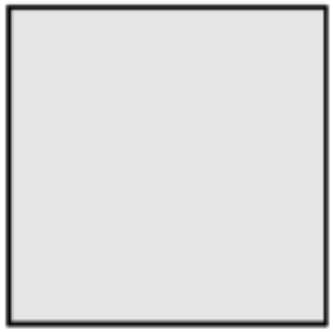

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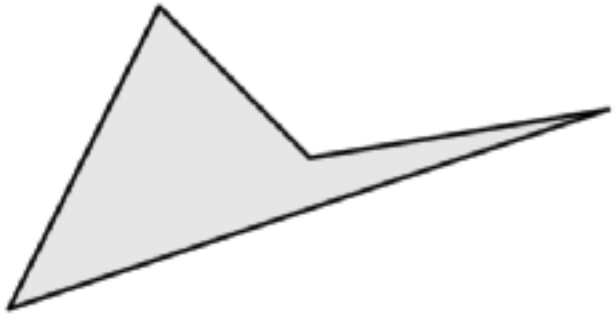

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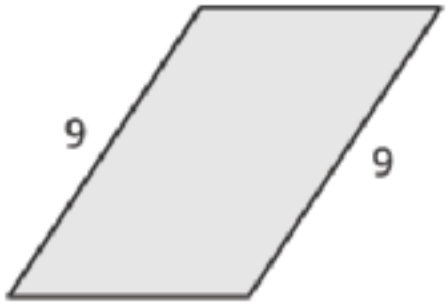

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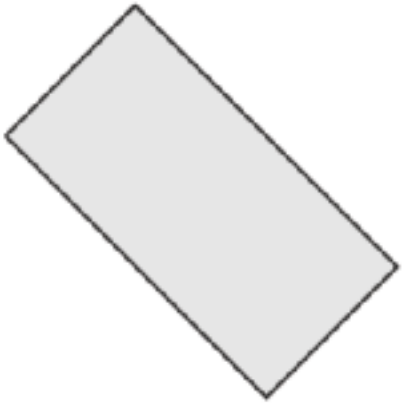

Triangle Cards Grade 5

Triangle Cards Grade 5

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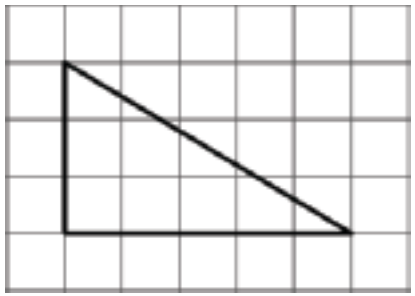

Triangle Cards Grade 5

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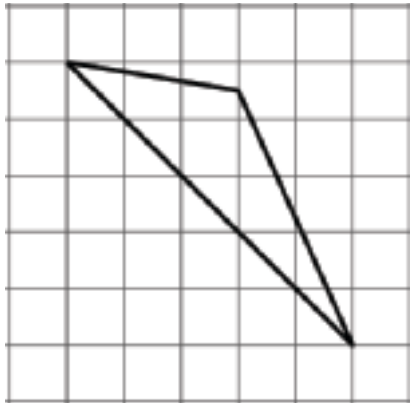

Triangle Cards Grade 5

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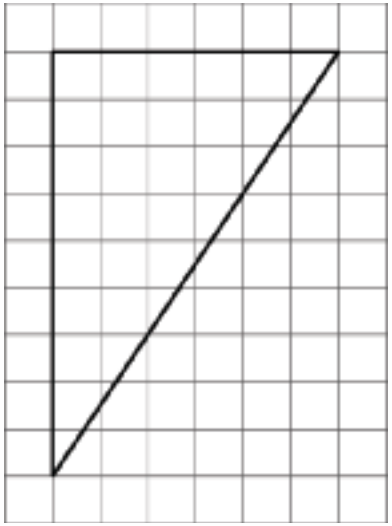

Triangle Cards Grade 5

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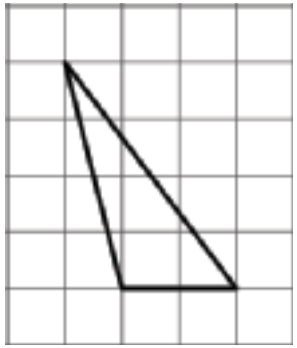


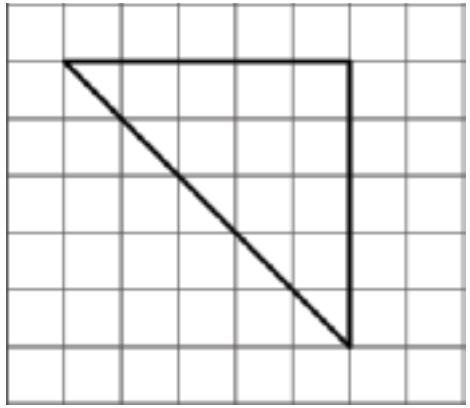
Triangle Cards Grade 5

Triangle Cards Grade 5

E

Triangle Cards Grade 5

F



Triangle Cards Grade 5

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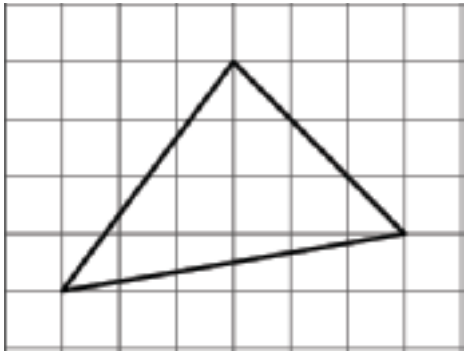

Triangle Cards Grade 5

H

Triangle Cards Grade 5

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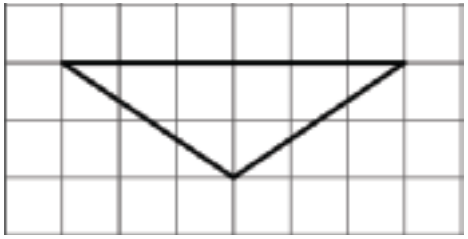

Triangle Cards Grade 5

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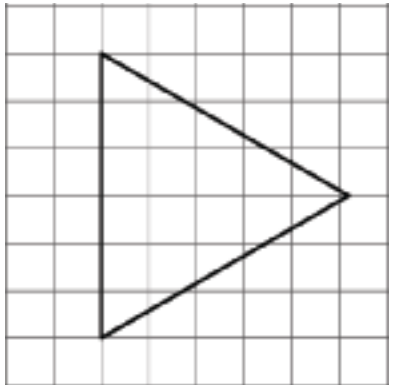

Triangle Cards Grade 5

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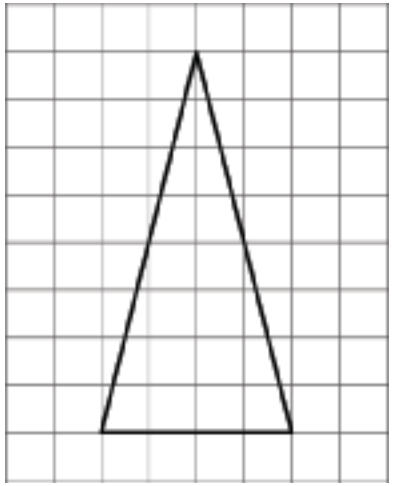

Triangle Cards Grade 5

L

Triangle Cards Grade 5

Triangle Cards Grade 5

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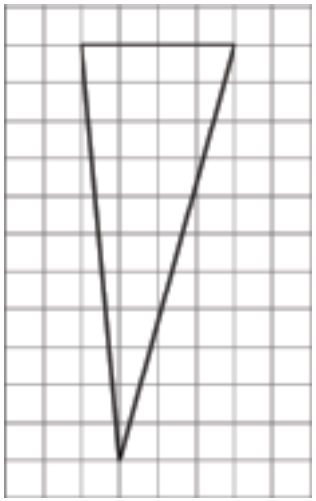

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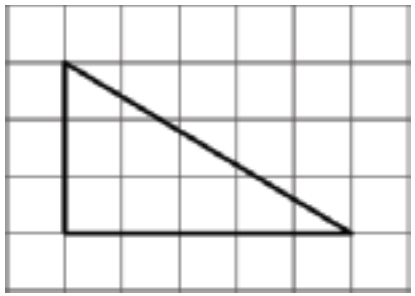

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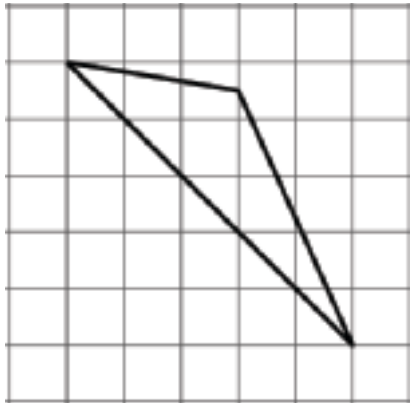

Triangle Cards Grade 5

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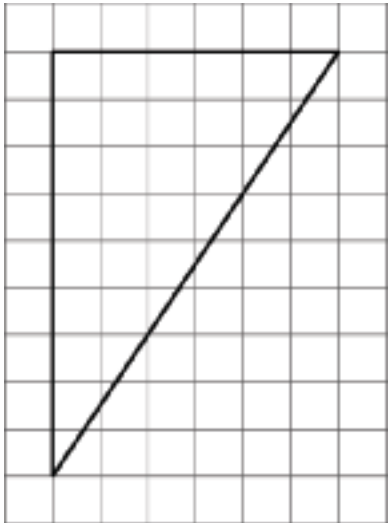
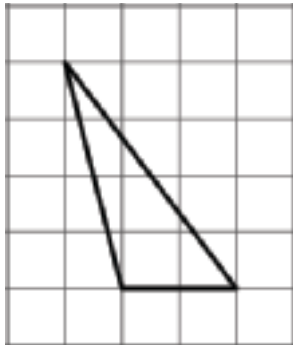


Triangle Cards Grade 5

D



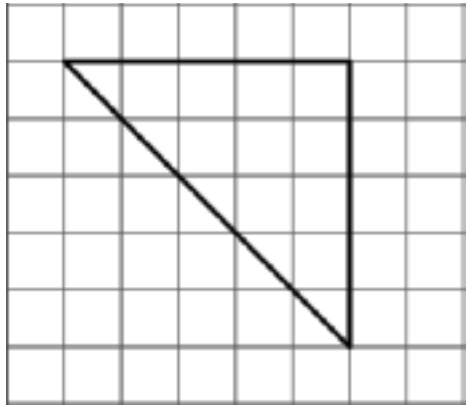
Triangle Cards Grade 5

Triangle Cards Grade 5

E

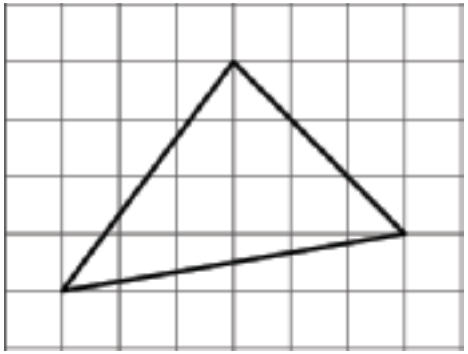
Triangle Cards Grade 5

F



Triangle Cards Grade 5

G



Triangle Cards Grade 5

H

Triangle Cards Grade 5

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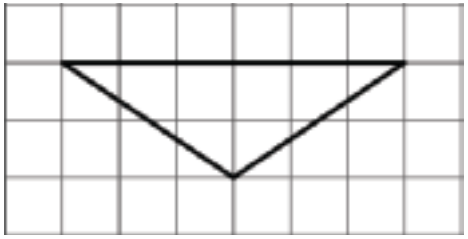
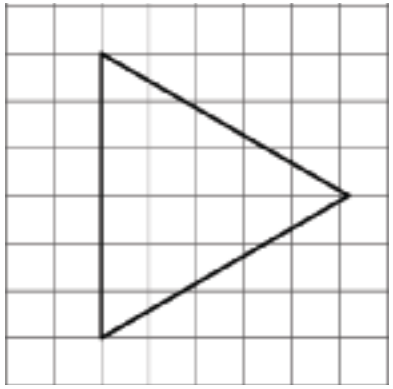


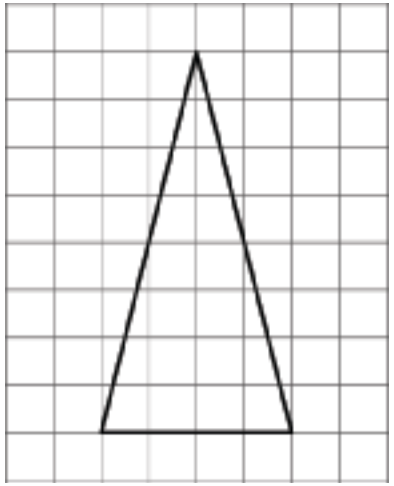
Triangle Cards Grade 5

J



Triangle Cards Grade 5

K



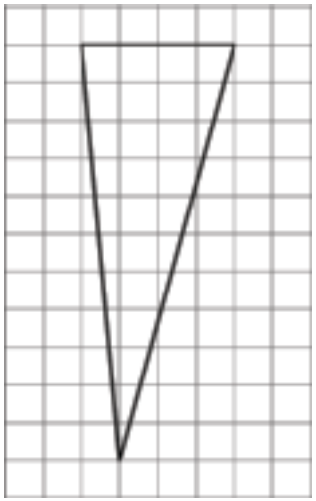
Triangle Cards Grade 5

L

Triangle Cards Grade 5

Triangle Cards Grade 5

M



Triangle Cards Grade 5

Triangle Cards Grade 5

Triangle Cards Grade 5

Picture Books Stage 3 Recording Sheet

Look for shapes in your book.

Sketch what you see.	Describe what you see.	What shape is it?

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 partners.
  - 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		

Credits

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