

K-8 Mathematics for Teachers

Sample Midterm And Final Exam Questions

Below are some sample problems for midterm and final exam questions on both semesters. This list is not intended to be comprehensive and it is not intended to limit the instructor's choice of examination questions. Rather, it is just a sample of questions based on the syllabus that the instructor might ask.

1. Completely reduce the fraction:

$$\frac{2^{200} - 2^{198}}{2^{200} + 2^{198}}$$

2. Find all values of x which satisfy

$$-\frac{4}{3}(14x - 5) = \frac{2}{3}(1 - x)$$

3. Use the standard long division algorithm to divide 509,731 by 663. Express the quotient as a mixed number (an integer and a proper fraction). Show all steps.

4. Using the fact that $\sqrt{2}$ is irrational, prove that $3\sqrt{2}$ is irrational.

5. The sum of three consecutive integers is 546. What is the smallest of these integers?

6. Use divisibility tests to determine whether the number 300,999,777,555,444 is divisible by: a) 2 b) 3 c) 4 d) 5 e) 6

7. Draw a Venn Diagram which depicts the set $\overline{A} \cap (B \cup C)$.

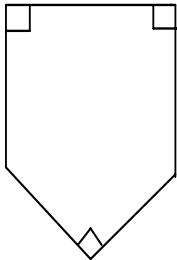
8. You buy a box of laundry detergent that contains 50 cups. If your washing machine calls for $1\frac{1}{4}$ cups per load, how many loads of wash can you do?

9. Calculate and simplify $\frac{1}{3} + \frac{5}{4}(\frac{1}{4} \div \frac{5}{6})$. Show your calculations in an organized fashion.

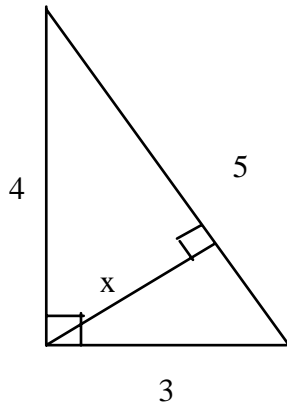
10. Find the exact decimal for $\frac{1}{7}$

11. Find a fraction represented by the repeating decimal $.543\overline{737}$

12. What is
- the associative property of addition for whole numbers?
 - the commutative property of multiplication for whole numbers?
 - the additive identity for whole numbers?
 - the distributive property of multiplication over addition?
13. Find an irrational number between .999 and 1.
14. Find the greatest common divisor, $\text{GCD}(2666, 1457)$
15. Let $a, b,$ and d be positive integers. Prove that if $d \mid \text{GCD}(a, b)$ then $d \mid a$ and $d \mid b$, or give a counterexample.
16. Determine which of these two numbers is larger: 12^{10} or 3^{20} . Explain your reasoning.
17. Let the base ten number $abcd$ represent $a1000 + b100 + c10 + d$. Suppose $d = 5$. Explain clearly why $5 \mid abcd$.
18. If two dice are rolled, what is the probability that the sum of the numbers shown on the dice is 7?
19. Mike took four tests: English, Math, Science, and History. He got a 74 in English and an 84 in History. The mean of the four tests was 72. Math was better than Science by a score of 6. What was the science score?
20. Use a straight edge to draw a line segment. Then use a compass and straight edge to bisect your line segment. Leave all relevant pencil marks for the construction and no others.
21. Home plate on a baseball field has three right angles and two congruent angles. Find the measures of each of these two congruent angles. Explain your reasoning.



22. Find the length x of the altitude of the large right triangle below. Explain your reasoning.



23. A humming bird, starting from a flower, flew parallel to the ground 5 feet North and then 4 feet West. If it then flew 3 feet straight up (vertically) and hovered, how far away from the flower would it be?

24. Fill in the blanks:

a. $65,099 \text{ g} = \underline{\hspace{2cm}} \text{ kg}$

b. $2 \text{ L} = \underline{\hspace{2cm}} \text{ cm}^3$

c. $23 \text{ m}^3 = \underline{\hspace{2cm}} \text{ cm}^3$

d. $3000 \text{ m}^3 = \underline{\hspace{2cm}} \text{ km}^3$

e. $100^\circ \text{ C} = \underline{\hspace{2cm}}^\circ \text{ F}$

25. How many miles per hour is 0.1 kilometers per minute?

26. A cylindrical container can hold 2 quarts of water. If its radius and height are both doubled, how much water can it hold?

27. Find all values of x where the graph of $y = 3x^2 + 5x + 1$ intersects the x -axis.

28. What is the y -intercept of the equation $3x + 5y = 7$? What is its slope?

29. Three angles in a triangle have measures, in degrees, of x , $x + 1$, and x^2 . Find x exactly. Do not find a decimal approximation.

30. Both the radius and height of a cylinder are the same as the radius of a sphere.

a. Which of the two has the greater volume? (Explain your answer, no credit for guessing)