

MATHCOUNTS®

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2021 CHAPTER COMPETITION Sprint Round Problems 1–30

Name _____

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DO NOT BEGIN UNTIL YOU ARE INSTRUCTED TO DO SO.

This section of the competition consists of 30 problems. You will have 40 minutes to complete all the problems. You are not allowed to use calculators, books or other aids during this round. Calculations may be done on scratch paper. All answers must be complete, legible and simplified to lowest terms. Record only final answers in the blanks in the left-hand column of the competition booklet. If you complete the problems before time is called, use the remaining time to check your answers.

In each written round of the competition, the required unit for the answer is included in the answer blank. The plural form of the unit is always used, even if the answer appears to require the singular form of the unit. The unit provided in the answer blank is the only form of the answer that will be accepted.



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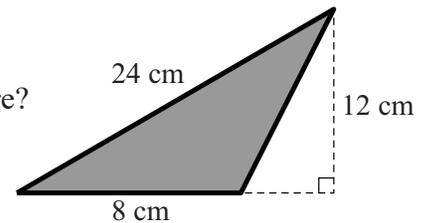
FOUNDING SPONSORS: National Society of Professional Engineers, National Council of Teachers of Mathematics and CNA Insurance

1. _____ pounds Andy's dog weighs 27 pounds, which is $\frac{3}{4}$ the weight of Seher's dog. How many pounds does Seher's dog weigh?

2. _____ mi/h It took Tamisha 15 minutes to drive 10 miles to her grandma's house. What was her average speed, in miles per hour?

3. _____ marbles Juan has 240 marbles. This is three times as many marbles as Jon and Jeremy have combined. If Jon has 50 marbles, how many marbles does Jeremy have?

4. _____ cm^2 What is the area of the shaded triangle, shown here?



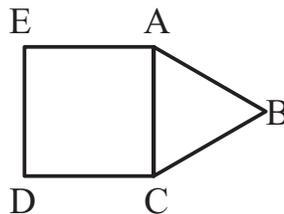
5. _____ $^{\circ}\text{F}$ On Friday in Omaha, the temperature at 6:00 a.m. was -3°F . By noon, the temperature had risen to 3°F . How many degrees warmer was it at noon than it was at 6:00 a.m.?

6. _____ times The average length of the human tongue is 3.9 inches. At an average length of 19 inches, a giraffe's tongue is how many times that of a human? Express your answer to the nearest integer.

7. _____ cups To make slime, mix 1 ounce of school glue with $\frac{1}{2}$ cup of water and $\frac{1}{4}$ cup of sodium tetraborate. How many cups of water would be needed to make a batch of slime using $\frac{1}{2}$ cup of sodium tetraborate?

8. _____ If $\frac{1}{6} + \frac{1}{7} + \frac{1}{n} = \frac{1}{3}$, what is the value of n ?

9. _____ meters Equilateral triangle ABC and square ACDE share side AC as shown. If square ACDE has area 9 m^2 , what is the perimeter of pentagon ABCDE?



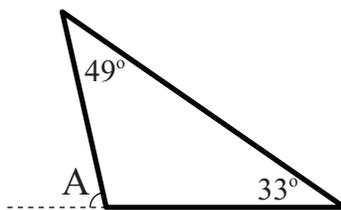
10. \$ _____ Company A sells pencils in packs of 12 for \$1.50. Company B sells pencils in packs of 15 for \$2.00. What is the absolute difference of the total costs to purchase 60 pencils from each company?

11. _____ What is the smallest even integer greater than 10,000 that contains three distinct odd digits?

12. \$ _____ Sean had \$72 in his bank account before he spent $\frac{1}{4}$ of it on a birthday present for his mom. He then deposited \$54.33 into his bank account. How much money does Sean have in his account now?

13. _____ primes What is the fewest number of consecutive primes, starting with 2, that when summed produce a number divisible by 7?

14. _____ degrees What is the degree measure of angle A in the figure shown here?



15. _____ What is the value of $(1.6 + 5)^2 - 1.6^2 - 5^2$?

16. _____ On a number line, what number is two-thirds of the way from $\frac{5}{8}$ to $\frac{7}{4}$? Express your answer as a common fraction.

17. _____ If the cube of a positive number is three times the square of the number, what is the number?

18. _____ gallons Jan and Jerome are mixing red paint with white paint to make pink paint, in the ratio of 4 parts red to 5 parts white. How many gallons of red paint should they mix with 1 gallon of white paint? Express your answer as a common fraction.

19. _____ % The population of Clown Town in 2020 was 24,500. In 2021, the population had risen to 26,950. What was the percent increase in population of Clown Town?

20. _____ students A class meets one day a week for four weeks. The number of students in attendance at each of the four class meetings is given in the table shown. What is the sum of the mean and median number of students in attendance per week?

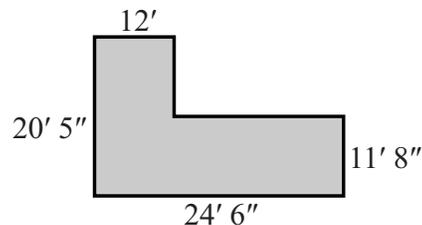
Meeting	Attendance
Week 1	32
Week 2	27
Week 3	28
Week 4	23

21. _____ What is the value of $99^2 + 101^2$?

22. \$ _____ Griffin bakes a perfectly circular pizza with a diameter of 10 inches, and he sells it for \$0.20 per square inch. What is the cost for the entire pizza? Express your answer to the nearest whole dollar.

23. _____ What is the arithmetic mean of the first ten positive perfect squares? Express your answer as a decimal to the nearest tenth.

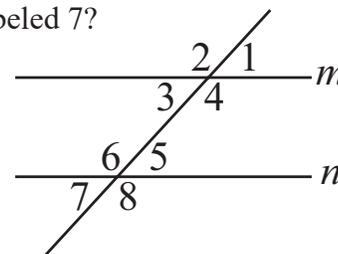
24. _____ cans This figure shows the floorplan of a room that includes a door and a window that have a combined area of 50 ft^2 . Each side of the room has a wall that is 8 feet tall, and adjacent walls meet at right angles. If a can of paint covers an area of 400 ft^2 , how many whole cans of paint must be purchased to paint the interior walls of this room, not including the door and the window?



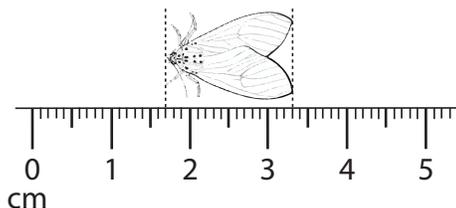
25. _____ quarters Sam has exactly \$18.90 in dimes and quarters, with twice as many dimes as quarters. He spends five quarters and twice as many dimes at the convenience store, and he spends 55 cents at the donut shop. If he pays the exact amount for everything, how many quarters does Sam have left?

26. _____ Quinn is hanging a framed picture that is 10 inches wide and 6 inches tall on a wall that is 8 feet 7 inches wide and 7 feet 4 inches tall. When the picture is exactly centered on the wall, the left edge of the picture frame is x feet y inches from the left edge of the wall. What is the value of y , if $y < 12$? Express your answer as a mixed number.

27. _____ degrees In the figure shown, lines m and n are parallel, and the angle labeled 4 measures 104 degrees. What is the degree measure of the angle labeled 7?



28. _____ moths In the figure, a terrenella bee moth (*Aphomia terrenella*) is pictured next to part of a ruler marked in centimeters. How many terrenella bee moths of equal length, placed end to end, have a combined length of 2 meters?



29. _____ Eli started saving money in his empty piggy bank. He inserted \$1 on every Monday, \$2 on every Tuesday, \$3 on every Wednesday, \$4 on every Thursday, \$5 on every Friday, \$6 on every Saturday, and \$7 on every Sunday. At the end of 24 days, he opened his bank and found he had \$93. On which day of the week did he start inserting money into his piggy bank?

30. _____ revolutions In the figure shown, the cogwheel labeled A makes one revolution every 2 seconds. How many revolutions will cogwheel B make every minute?

