
MATHCOUNTS®

2017

■ Chapter Competition ■
Sprint Round
Problems 1–30

HONOR PLEDGE

I pledge to uphold the highest principles of honesty and integrity as a Mathlete®. I will neither give nor accept unauthorized assistance of any kind. I will not copy another's work and submit it as my own. I understand that any competitor found to be in violation of this honor pledge is subject to disqualification.

Signature _____ Date _____

Printed Name _____

School _____

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. If you are wearing a calculator wrist watch, please give it to your proctor now. 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.

Total Correct	Scorer's Initials

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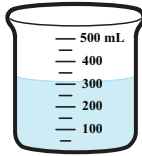
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02-C17SPR

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1. _____ What integer is closest in value to 21.476?

2. _____ mL



What is the volume of the solution in the beaker? Express your answer to the nearest hundred.

3. _____ Debbie is counting by fives. If the first number she says is 110, what is the fifth number Debbie says?

4. _____ What is the difference between seven times six and five times four?

5. _____ ounces A carton of one dozen jumbo eggs has a total weight of 32 ounces. If the carton itself weighs 2 ounces, how much does each egg weigh, on average? Express your answer as a decimal to the nearest tenth.

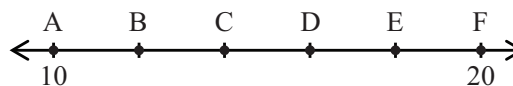
6. _____ feet Given that 3 feet = 1 yard and 240 yards = 1 cable, how many feet are equal to 1 cable?

7. _____ Velma earned the following scores on seven science quizzes: 88, 95, 84, 100, 86, 99, 94. What is the median of Velma's quiz scores?

8. _____ students When half of the students in Mr. Freeman's class joined the National Math Club, there were 13 students who did not join. What is the total number of students in Mr. Freeman's class?

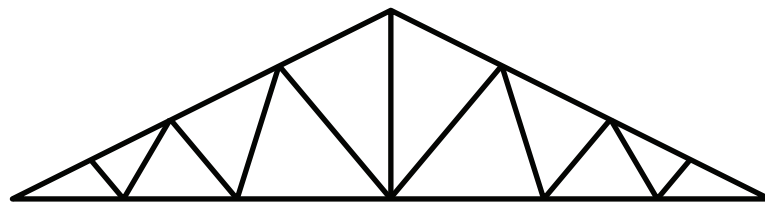
9. _____ What is the value of $100 - \frac{10}{0.1}$?

10. _____ units Points A through F are evenly spaced on the number line shown. How many units long is segment CF?



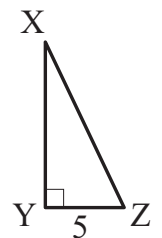
11. _____ students The number of 8th graders who responded to a poll of 6th and 8th graders was one-fourth of the number of 6th graders who responded. If a total of 100 students responded to the poll, how many of the students who responded were 6th graders?

12. _____ triangles How many triangles of any size are in the Belgian truss shown?



13. _____ cats The ratio of dogs to cats in a pet store is 7:5. If there are 6 more dogs than cats, how many cats are in the pet store?

14. _____ inches Right triangle XYZ, with $YZ = 5$ inches, has area 30 in^2 . What is the length of side XY?



15. _____ What is the value of $\left(\frac{1}{3}\right)^{-2}$?

16. _____ If the sum of the positive integer a and 5 is less than 12, what is the sum of all possible values of a ?

17. _____ percent The table shows the five methods of transportation that the 360 students who attend Newburg Middle School use to get to school. If every student chooses exactly one of these as his or her primary method of transportation to school, what percent of the students bike to school?

TRANSPORTATION TO NEWBURG MIDDLE SCHOOL	
Method of Transportation	# Students
Car	66
Bus	138
Bike	90
Scooter	18
Walk	48

18. _____ large jugs A camel can carry a maximum weight equal to either 18 identical large jugs of water or 30 identical small jugs of water. If the camel is loaded with 25 small jugs of water, how many additional large jugs of water can the camel carry?

19. _____ What decimal is equivalent to $\frac{1}{2}$ percent?

20. _____ What is the sum of the solutions of $x^2 + 5x + 6 = 0$?

21. _____ What is the quotient when 1000 is divided by $2^3 \times 5^2$?
22. \$ _____ On the side of a taxi, fares are listed as \$2.25 for the first $\frac{1}{2}$ mile and 75¢ for each additional $\frac{1}{4}$ mile. What is the fare for a 3-mile ride in this taxi?
23. _____ boys Last summer, 150 students attended the Apollo Math Camp, of whom 96 were girls and 54 were boys. Also, 68 were 7th graders and 82 were 8th graders. How many 8th-grade boys attended the camp if 40 of the girls were 7th graders?
24. _____ What is the largest sum that results when one of the arrangements of the digits of 2017 is added to one of the arrangements of the digits of 2016, if none of the digits 0, 1 or 2 can occupy the same position in both numbers?
25. _____ pairs How many pairs of positive integers x and y are solutions of $\frac{x}{12} + \frac{y}{36} = 1$?

26. _____ What positive value should replace x in this statement to make it true?

$$55 \times 59 - 53 \times 57 = x^2 - 1$$

27. _____ The Pythagoreans proved this pattern:

$$1^2 = 1$$

$$2^2 = 1 + 3$$

$$3^2 = 1 + 3 + 5$$

$$4^2 = 1 + 3 + 5 + 7$$

Nicomachus discovered this pattern:

$$1^3 = 1$$

$$2^3 = 3 + 5$$

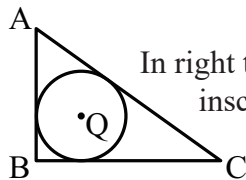
$$3^3 = 7 + 9 + 11$$

$$4^3 = 13 + 15 + 17 + 19$$

What is the value of s in this equation:

$$1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 + 7^3 + 8^3 = s^2$$

28. _____ in²



In right triangle ABC, shown here, $m\angle B = 90^\circ$ and $AB = 6$ inches. If inscribed circle Q has area 4π in², what is the area of triangle ABC?

29. _____ Yu has 12 coins, consisting of 5 pennies, 4 nickels and 3 dimes. He tosses them all in the air. What is the probability that the total value of the coins that land heads-up is exactly 30 cents? Express your answer as a common fraction.

30. _____ ordered quintuples
quintuples How many ordered quintuples (a, b, c, d, e) have coordinates of value $-1, 0$ or 1 and satisfy $a + b^2 + c^3 + d^4 + e^5 = 2$?