

MATHCOUNTS®

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2024 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 _____

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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.

Total Correct	Scorer's Initials

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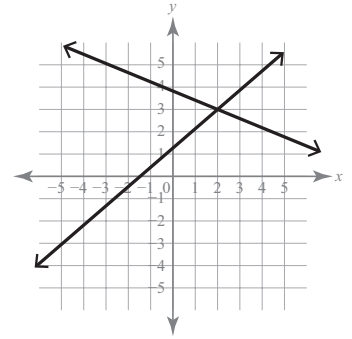
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1. _____ What is the median of the following numbers: 529.14, 529.12, 529.13, 529.15, 529.16, 529.14? Express your answer as a decimal to the nearest hundredth.

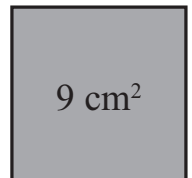
2. (,) Two lines are graphed on the coordinate grid shown. What are the coordinates of the intersection of the two lines? Express your answer as an ordered pair.



3. _____ What is the absolute difference between -3^2 and $(-3)^2$?

4. _____ If $f(x) = 2^x + 5$, what is the value of $f(4)$?

5. _____ cm What is the perimeter of the square shown here with area 9 cm^2 ?



6. _____ If $3b + 12 + 7 = 5b + 11$, what is the value of b ?

7. _____ cm A heptadecagon is a 17-sided polygon. If a regular heptadecagon has perimeter 306 cm, what is its side length?

8. _____ combinations Vinnie is ordering a 2-topping pizza, and the table shows the three choices of meat and five choices of vegetable toppings offered. How many different combinations of one meat topping and one vegetable topping are there?

Meats	Vegetables	
Pepperoni	Olives	Spinach
Sausage	Onions	Tomatoes
Bacon	Peppers	

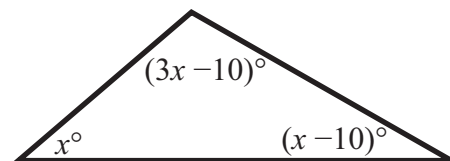
9. _____ The number $5\sqrt{2}$ is the square root of which positive integer?

10. _____ words Mr. Juarez can type 84 words per minute. How many words can Mr. Juarez type in 2 minutes and 30 seconds?

11. _____ students This year, there are 750 students enrolled at Blake Middle School. This is an increase of 25% compared to last year. How many students were enrolled at Blake Middle School last year?

12. _____ zips If 5 zips equal 4 squawks, and 3 squawks equal 5 bangs, how many zips equal 12 bangs?

13. _____ degrees If the degree measures of the angles of a triangle can be expressed as x , $3x - 10$ and $x - 10$, what is the measure of the largest angle?



14. _____ hours Tiffani is a stylist at a salon that specializes in hair braiding. It takes Tiffani 15 minutes to complete two rows of box braids. At this rate, how many hours will it take Tiffani to complete a hairstyle that consists of 42 rows of box braids? Express your answer as a mixed number.

15. _____ inches The area of a rectangle is 24 in^2 . If the length of the rectangle is 1.5 times its width, what is the rectangle's perimeter?

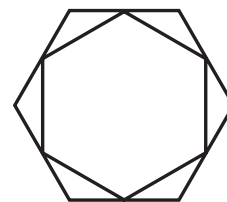
16. _____ The product of two integers is 36. What is the greatest difference the two numbers could have?
17. _____ A positive integer less than 100 has fewer than six positive factors. What is the greatest possible value of this integer?
18. _____ cm^2 A right triangle with one leg measuring 8 cm has an area of 24 cm^2 . If the lengths of the legs are increased by 2 cm, what is the area of the resulting right triangle?
19. _____ members Ms. Keaton emptied bags of candy into a bowl before the math club meeting. At the beginning of the meeting, the club members in attendance each took two pieces of candy from the bowl. During the meeting, Ms. Keaton found another bag of candy and added those 17 pieces of candy to the bowl. At the end of the meeting, each club member, except the one who left the meeting early, took one additional piece of candy from the bowl. If there were 27 pieces of candy left in the bowl after the meeting and there were twice as many pieces of candy in the bowl before the meeting, how many club members attended the meeting?
20. _____ What is the value of the expression shown? Express your answer as a common fraction.

$$1 + \frac{1}{1 + \frac{2}{1 + \frac{3}{1 + \frac{5}{1 + 7}}}}$$

21. _____ The product of 3 consecutive multiples of 5 is 42,000. What is the least of the three multiples?

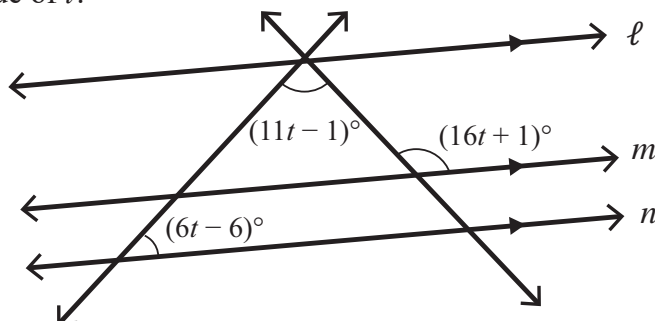
22. _____ Alva adds up all the positive integers less than 2023 and Beth adds up all the even positive integers less than 2023. What is the remainder when the absolute difference between Alva's and Beth's sums is divided by 1000?

23. _____ Aaron draws a regular hexagon. Then Bekah connects the midpoints of the sides of Aaron's hexagon to form another regular hexagon, as shown. What is the ratio of the area of Bekah's hexagon to the area of Aaron's hexagon? Express your answer as a common fraction.



24. _____ At a certain MATHCOUNTS Chapter Competition, the top six Mathletes' scores on the Sprint Round were 23, 24, 26, 28, 28 and 29. Those same Mathletes' scores on the Target Round were 10, 10, 12, 12, 14 and 16 (not necessarily in the same order). First place is awarded to the Mathlete with the highest combined Sprint Round and Target Round scores. What is the least possible score for the first-place Mathlete?

25. _____ In the figure shown, lines ℓ , m and n are parallel. Given the indicated angle measures, what is the value of t ?



26. _____ What is the sum of all positive solutions to $(x - 1)(x^2 + x - 2)(x^2 - 5x + 6) = 12(x^2 - 4x + 3)(x + 2)$?

27. _____ Edward has a meeting at 4:00 p.m. He leaves his house at a random time between 3:00 p.m. and 3:30 p.m., and due to traffic, it takes him a random length of time between 30 and 45 minutes to get to the meeting from his house. What is the probability that Edward arrives early? Express your answer as a common fraction.

28. _____ What is the least nine-digit positive integer that contains each of the digits from 1 to 9 exactly once, and is divisible by 99?

29. _____ Stephanie rolls three standard dice. What is the probability that the product of the three numbers she rolled is not a multiple of 8? Express your answer as a common fraction.

30. _____ cm^2 Circle O has radius 6 cm. Point A lies outside circle O, and the rays with endpoint A are tangent to circle O at points C and D. Similarly, point B lies outside circle O, and the rays with endpoint B are tangent to circle O at points E and F, as shown. If $m\angle CAD = m\angle EBF = 60$ degrees and $m\angle AOB = 90$ degrees, what is the area of quadrilateral CEDF?

