

UPDATED

MATHCOUNTS®

2026 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. 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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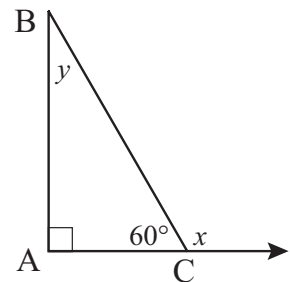
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1. _____ What is the value of $(7 \times 2) - (3 \times 4 + 2)$?

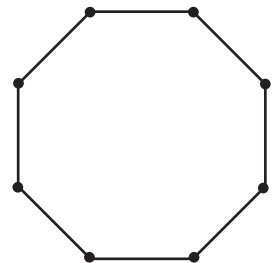
2. _____ chocolates Stefani went to the store to buy 3 chocolates for each of her 5 classmates. While shopping, she decided instead to buy 5 chocolates for each classmate. How many additional chocolates does she need to buy compared to her initial plan?

3. _____ What is the least perfect square whose digits are all prime?

4. _____ degrees Triangle ABC, shown, is a right triangle with side AC extended. What is the value of $x + y$?

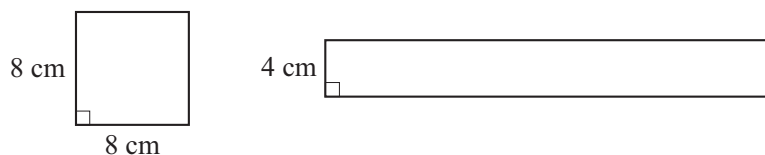


5. _____ lines How many lines of symmetry of a regular octagon go through *at least one* of its vertices?



6. _____ If $x \# y = 2x + 3y$, then $4 \# 1 = 2(4) + 3(1) = 11$. What is $2 \# 3$?

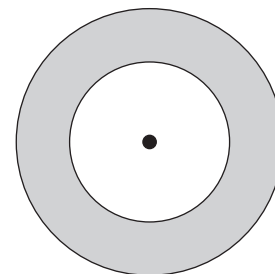
7. _____ cm The area of a rectangle is twice the area of a square with side length 8 cm. If one of the side lengths of the rectangle is 4 cm, what is the perimeter of the rectangle?



8. _____ Janelle writes the positive integers less than or equal to 26 on a white board. What is the sum of the multiples of 3 that she wrote?

9. _____ in² A right triangle has side lengths $\frac{7}{2}$, $\frac{29}{6}$ and $\frac{10}{3}$ inches. What is its area? Express your answer as a common fraction.

10. _____ ft² In the diagram shown, the larger circle has a diameter of 10 feet and the smaller circle has a diameter of 6 feet. What is the area, in square feet, of the shaded region? Express your answer in terms of π .



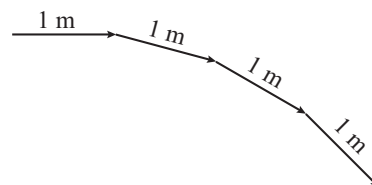
11. _____ years Addison is 31 years old, and her daughter Madison is 6 years old. In how many years will Madison's age be half of Addison's age?

12. _____ % If $x - 15$ is 80% of x , what percent of x is $x + 15$?

13. \$ Charlene is looking at part-time jobs from three local businesses. Al's Avocados pays \$250 dollars a week no matter what. Bertha's Burritos pays \$20 an hour. Carl's Cantaloupes pays \$15 an hour for the first 10 hours and \$25 an hour beyond that. Charlene's desired number of hours per week would pay her the same at Al's and at Carl's. How much would she make per week if she took the job at Bertha's?

14. _____ Amy and Bob each own a square plot of land. Amy's plot measures 75 meters on each side, while Bob's measures 25 meters on each side. What is the ratio of the area of Bob's land to the area of Amy's land? Express your answer as a common fraction.

15. _____ meters Carson is pushing a broken shopping cart in a series of straight-line segments. After every meter he pushes it, a wheel locks, causing an instantaneous 15-degree turn to the right before it continues forward. Eventually, he finds himself back where he started for the first time. How far, in meters, has he pushed the cart?

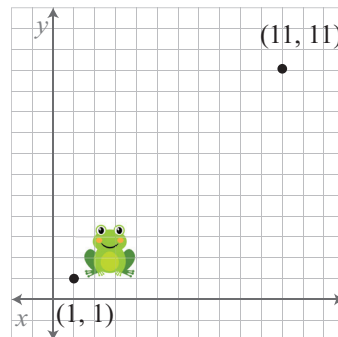


16. _____ cakes Jamie has a small business selling pies and cakes. He sells pies for \$10.00 each and cakes for \$12.00 each. His revenue from selling cakes is the same as his revenue from selling pies. If he sells 240 pies in a month, how many cakes does he sell that month?
17. _____ units² A rectangle has perimeter 26 units, and two of its side lengths sum to 20 units. What is the area of the rectangle?
18. _____ integers How many three-digit positive integers have three digits whose product is 18?
19. _____ positive terms The first and twenty-first terms of an arithmetic progression are 26 and -4 , respectively. How many positive terms does the progression have?
20. _____ inches A rhombus with area 60 in^2 has a diagonal of length 6 inches. How many inches long is a side of this rhombus? Express your answer in simplest radical form.

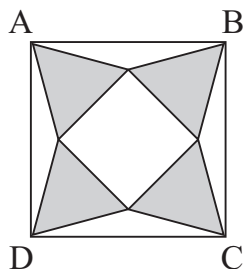
21. _____ Haley tosses a fair coin five times. What is the probability that at least two consecutive tosses show the same result? Express your answer as a common fraction.
22. _____ $\frac{\text{floors}}{\text{per second}}$ An elevator in a high-rise apartment building takes some fixed amount of time to start moving at the beginning of each trip. After starting up, it travels at a constant speed until reaching its destination. A ride from the 20th floor to the 26th floor takes 15 seconds, while a ride from the 2nd floor to the 35th floor takes exactly 1 minute. What is the speed of the elevator when the elevator is moving, in floors per second? Express your answer as a common fraction.
23. _____ ways After placing a delivery order for pizza, five friends realize they've run out of soda. They decide that some will go buy more soda while the rest wait for the pizza, with at least one person assigned to each task. In how many ways can the five friends divide themselves between the two tasks?
24. _____ If a and b are positive integers such that $\frac{1}{a} + \frac{1}{b} = \frac{2}{3}$, what is the sum of the two distinct possible values of ab ?
25. _____ students Half of the students in Dr. Papanikolas's class play the piano, and a third of them play the cello. If there are three students in the class who play both instruments, and twenty who play neither instrument, how many total students are there in Dr. Papanikolas's class?

26. _____ The equation $6x^2 + 11x - 10 = 0$ has two solutions, $x = a$ and $x = b$. What is the value of $a + b - ab$? Express your answer as a common fraction.

27. _____ paths Oddie the frog wants to hop from $(1, 1)$ to $(11, 11)$. On each hop, Oddie can jump either one unit upward or one unit to the right, but only to a location having at least one odd coordinate. How many different paths can Oddie take to reach his destination?



28. _____ units² In the drawing below, equilateral triangles are erected on the outside of a square, with shared edges of the square and each triangle coinciding exactly. The total area of the shaded region shown is $100\sqrt{3}$ units². What is the total unshaded area inside ABCD?



29. _____ integers A digit d in a positive integer is *dominant* if at least half of the digits in the integer are the digit d . How many positive integers less than or equal to 2026 have at least one dominant digit?

30. _____ If the real number x satisfies the equation $\sqrt{x^2 + \sqrt{x}} + \sqrt{x^2 - \sqrt{x}} = 2$, what is the value of $8x$? Express your answer in simplest radical form.

Forms of Answers

The following list explains acceptable forms for answers. Coaches should ensure that Mathletes are familiar with these rules prior to participating at any level of competition. Competition answers will be scored in compliance with these rules for forms of answers.

Units of measurement are not required in answers, but they must be correct if given. When a problem asks for an answer expressed in a specific unit of measure or when a unit of measure is provided in the answer blank, equivalent answers expressed in other units are not acceptable. For example, if a problem asks for the number of ounces and 36 oz is the correct answer, 2 lbs 4 oz will not be accepted. If a problem asks for the number of cents and 25 cents is the correct answer, \$0.25 will not be accepted.

The plural form of the units will always be provided in the answer blank, even if the answer appears to require the singular form of the units.

Geometric figures may not be drawn to scale and lengths of geometric figures should be assumed to be measured in “units” unless otherwise stated.

All answers must be expressed in simplest form. A “common fraction” is to be considered a fraction in the form $\pm \frac{a}{b}$, where a and b are natural numbers and $\text{GCF}(a, b) = 1$. In some cases the term “common fraction” is to be considered a fraction in the form $\frac{A}{B}$, where A and B are algebraic expressions and A and B do not share a common factor. A simplified “mixed number” (“mixed numeral,” “mixed fraction”) is to be considered a fraction in the form $\pm N \frac{a}{b}$, where N , a and b are natural numbers, $a < b$ and $\text{GCF}(a, b) = 1$. Examples:

Problem: What is $8 \div 12$ expressed as a common fraction?

Answer: $\frac{2}{3}$

Unacceptable: $\frac{4}{6}$

Problem: What is $12 \div 8$ expressed as a common fraction?

Answer: $\frac{3}{2}$

Unacceptable: $\frac{12}{8}$, $1\frac{1}{2}$

Problem: What is the sum of the lengths of the radius and the circumference of a circle with diameter $\frac{1}{4}$ unit expressed as a common fraction in terms of π ?

Answer: $\frac{1+2\pi}{8}$

Problem: What is $20 \div 12$ expressed as a mixed number?

Answer: $1\frac{2}{3}$

Unacceptable: $1\frac{8}{12}$, $\frac{5}{3}$

Ratios should be expressed as simplified common fractions unless otherwise specified. Examples:

Acceptable Simplified Forms: $\frac{7}{2}$, $\frac{3}{\pi}$, $\frac{4-\pi}{6}$

Unacceptable: $3\frac{1}{2}$, $\frac{1}{3}$, 3.5, 2:1

Radicals must be simplified. A simplified radical must satisfy: 1) no radicands have a factor which possesses the root indicated by the index; 2) no radicands contain fractions; and 3) no radicals appear in the denominator of a fraction.

Numbers with fractional exponents are *not* in radical form. Examples:

Problem: What is $\sqrt{15} \times \sqrt{5}$ expressed in simplest radical form?

Answer: $5\sqrt{3}$

Unacceptable: $\sqrt{75}$

Answers to problems asking for a response in the form of a dollar amount or an unspecified monetary unit (e.g., “How many dollars...,” “How much will it cost...,” “What is the amount of interest...”) should be expressed in the form (\$) $a.bc$ or $a.bc$ (dollars), where a is an integer and b and c are digits. The *only* exceptions to this rule are when a is zero, in which case it may be omitted, or when b and c both are zero, in which case they both may be omitted. Answers in the form (\$) $a.bc$ or $a.bc$ (dollars) should be rounded to the nearest cent unless otherwise specified. Examples:

Acceptable Forms: 2.35, 0.38, .38, 5.00, 5

Unacceptable: 4.9, 8.0

Do not make approximations for numbers (e.g., π , $\frac{2}{3}$, $5\sqrt{3}$) in the data given or in solutions unless the problem says to do so.

Do not perform any intermediate rounding (other than the “rounding” a calculator does) when calculating solutions. All rounding should be done at the end of the computation process.

Scientific notation should be expressed in the form $a \times 10^n$ where a is a decimal, $1 \leq |a| < 10$, and n is an integer. Examples:

Problem: What is 6895 expressed in scientific notation?

Answer: 6.895×10^3

Problem: What is 40,000 expressed in scientific notation?

Answer: 4×10^4 or 4.0×10^4

An answer expressed to a greater or lesser degree of accuracy than called for in the problem will not be accepted.

Whole-number answers should be expressed in their whole-number form. Thus, 25.0 will not be accepted for 25, and 25 will not be accepted for 25.0.