MATHCOUNTS®

2025 Chapter Competition

Countdown Round Problems 1–80

This booklet contains problems to be used in the Countdown Round.

1. _____ (dollars) If six eggs cost \$1.49, what is the cost of six dozen eggs, to the nearest dollar?

2. _____ Dalin randomly chooses a divisor of 2^{10}. What is the probability that Dalin's number is also a divisor of 12^3? Express your answer as a common fraction.

3. _____ (integers) How many different integers can be written as a sum of an element in the set $\{1, 2, 3, 4, 5\}$ and an element in the set $\{6, 7, 8, 9, 10\}$?

4. _____ What is the absolute difference between the mean and median of the five numbers 2, 5, 11, 14 and 23?

5. _____ What is the value of $\sqrt{20\sqrt{25}}$?

6. _____ A triangle with side lengths 2, 4, 4 is similar but not congruent to a triangle with side lengths 4, x, y. What is the value of x?

7. _____ Garrett's passcode has four digits. He knows the digits are 2, 6, 8 and 7, but he cannot recall their proper sequence. What is the probability that he will enter the correct passcode on his first try? Express your answer as a common fraction.

8. _____ What is the square root of the greatest two-digit positive integer with exactly three positive integer factors?

9. _____ If $2^5 \times 8^3 \times 16^2 = 4^m$, what is the value of m?

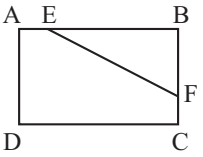
10. _____ (miles) In two hours, Sarah travels 102 miles driving at a constant speed. At this speed, how many miles will she travel in three hours?

11. _____ What is the average of the first 10 positive perfect squares? Express your answer as a decimal to the nearest tenth.

12. _____ If $2a + b = 13$, what is the value of $6a + 3b$?

13. _____ (points) Hattie has an average score of 84 points on five tests. If each test has a maximum possible score of 100 points, what is the least possible test score she could have earned on one of these tests?

14. _____ (cm^2) Rectangle ABCD has AB = 5 cm and BC = 3 cm. Points E and F lie on sides AB and BC, respectively, so that AE = CF = 1 cm. What is the area of pentagon AEFCD in cm^2?



15. _____ (rectangles) How many rectangles with integer side lengths can be traced out of a 1 × 3 grid of unit squares, with the sides of the rectangles along the grid lines?

16. _____ If $w + x - 4y = 500$ and $w + x + 6y = 1200$, what is the value of $w + x$?

17. _____ The sum of six consecutive integers is 3. What is their product?

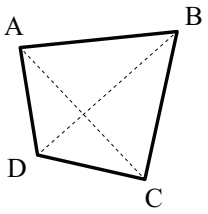
18. _____ (in^2) A right triangle has side lengths 4, 7 and $\sqrt{65}$ inches. What is its area, in square inches?

19. _____ (clanks) If 6 clanks are in a clink and 12 clinks are in 9 clonks, how many clanks are in a clonk?

20. _____ The number n has digits that are all prime numbers, and n can also be written as a^b, where a and b are integers greater than or equal to 2. What is the least possible value of n?

21. _____ If $f(x) = x^2 + 5$ and $g(x) = 2x - 3$, what is the value of $f(2) + g(4)$?

22. _____ (cm^2) In convex quadrilateral ABCD, the area of triangle ABC is 20 cm^2, the area of triangle ADC is 18 cm^2 and the area of triangle BCD is 25 cm^2. What is the area of triangle BAD, in square centimeters?



23. _____ (combinations) Justin has an unlimited supply of dimes and quarters. In how many different combinations of these coins can he pay exactly $5.00 for a board game?

24. _____ Three positive integers have a mean of 26. Their median is 27, which is five less than the greatest of the three integers. What is the least of these three integers?

25. _____ What positive integer x satisfies $(x - 3)(x - 4) = 12$?

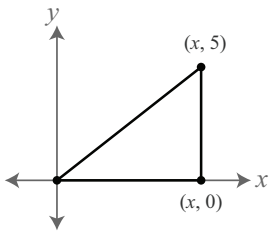
26. _____ What is the sum of all distinct prime number divisors of $\frac{22!}{20!}$?

27. _____ (integers) How many 3-digit positive integers exist whose digits are all positive and sum to 5?

28. _____ (spins) Leonard has a spinner with four equal parts labeled S, P, I and N, which he spins 72 times. What is the expected number of spins that land on the letter I?

29. _____ (marbles) A jar contains over 300 marbles. The marbles can be divided into 3, 5 or 7 equal piles with 2 marbles left over each time. What is the least possible number of marbles in this jar?

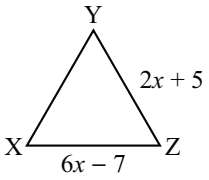
30. _____ A triangle with vertices located at (0, 0), (x, 0) and (x, 5) has area 30 $units^2$. What is the positive integer value of x?



31. _____ (swallows) A European swallow has a mass of 20 grams and is capable of lifting up to half of its body mass. If the swallows work together, what is the minimum number of swallows it will take to lift an 800-gram coconut?

32. _____ If $(x + 3) - (y + 5) = 19$, what is the value of $(x + 5) - (y + 3)$?

33. _____ (feet) In equilateral triangle XYZ, shown here, $YZ = 2x + 5$ and $XZ = 6x - 7$. If all lengths given are in feet, what is XY?



34. _____ What is the greatest of six consecutive odd integers whose sum is 216?

35. _____ A quadrilateral has distinct integer side lengths. If the perimeter of the quadrilateral is 14, what is the maximum possible product of its side lengths?

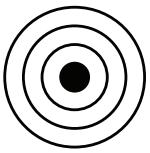
36. _____ If $2^x \times 3^y = 36$, what is the value of $x + y$?

37. _____ Consider the data collection 10, 12, 13, 15, 19, 23. When an integer x is included in this data collection, the new median is the same as that of the original collection. What is the value of x?

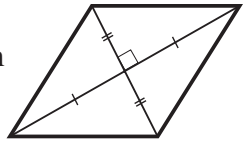
38. _____ (integers) How many positive integers are divisors of 18, but not of 63?

39. _____ (zeros) How many zeros appear at the end of the number $20^{25} \times 25^{20}$ when it is multiplied out (in base ten)?

40. _____ Two standard six-sided dice are rolled. What is the probability that the number showing on one of them is twice the number showing on the other? Express your answer as a common fraction.

41. _____ (%)  Christopher is practicing archery with a target consisting of a center circle (bullseye) with a 6 cm diameter and three outer rings, each with a width of 4 cm. The bullseye is what percent of the target area?

42. _____ (cm) How many centimeters are in the perimeter of a rhombus with diagonals of lengths 24 cm and 32 cm?



43. _____ Let k be a real number such that $\frac{2}{3} \geq \frac{5}{k}$. What is the least possible positive value of k? Express your answer as a decimal to the nearest tenth.

44. _____ What is the value of $13^2 - 12^2 - 5^2$?

45. _____ What is the probability that a randomly chosen positive integer divisor of 32 is a perfect square? Express your answer as a common fraction.

46. _____ What is the least positive perfect square that is a multiple of 24?

47. _____ Dante cut his blueberry pie into 6 equal slices. Joe ate $1\frac{1}{2}$ pieces. What fraction of the pie did Joe eat? Express your answer as a common fraction.

48. _____ The date February 22, 2022 (affectionately called "2s-day") was a Tuesday. What will be the next year after 2022 when February 22 falls on a Tuesday?

49. _____ Beginning with the number 100, Arlo begins counting down by 7s until he reaches a non-positive number. He then begins counting up by 6s until he reaches a number that is at least 100. What is the last number that Arlo counts?

50. _____ (degrees) The angles of a triangle form an arithmetic progression, and the smallest angle is 35 degrees. What is the degree measure of the largest angle of the triangle?

51. _____ Three of the four numbers 1, 2, 3, 4 are chosen without replacement. What is the sum of all possible distinct sums of these three numbers?

52. _____ What is the greatest positive three-digit integer whose digits sum to a prime number?

53. _____ (points) Elliot scored 25% more points in a game than Adrian did. If Adrian scored 220 points, how many points did Elliot score?

54. _____ What is the units digit of the sum $1^2 + 2^2 + 3^2 + 4^2 + 5^2$?

55. _____ If $x \clubsuit y = \frac{x^2}{y}$, what is the value of $6 \clubsuit 4$?

56. _____ (integers) How many different positive three-digit odd integers with three distinct digits can be formed using only the digits 5, 6, 7 and 8?

57. _____ What is the least positive integer, other than 19, that contains both the digits 1 and 9 and is a multiple of 19?

58. _____ The side lengths of a 45-gon are increased by a factor of 45. By what factor does the area increase?

59. _____ (in^3) The sum of the lengths of all edges of a cube is 84 in. What is the volume of the cube, in cubic inches?

60. _____ (hours) Sam reads an average of eight pages of a book in 10 minutes. At this rate, how many hours will it take Sam to read the entire 192-page book?

61. _____ (dimes) Leona has twelve coins totaling 85 cents. If she only has dimes and nickels, how many dimes does she have?

62. _____ (prime numbers) How many prime numbers have a digit sum of 3, with none of their digits being zero?

63. _____ What is the value of $\frac{(2^2+2)(3^2+3)(4^2+4)(5^2+5)}{(2^2-2)(3^2-3)(4^2-4)(5^2-5)}$?

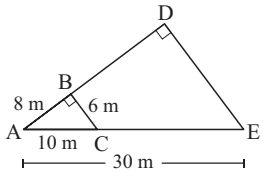
64. _____ What is the least integer value $n > 1$ such that $1 + 2 + 3 + \cdots + n$ is a perfect square?

65. _____ (integers) How many three-digit positive integers begin with a digit that, when squared, is less than the units digit of the number?

66. _____ What is the value of $1013^2 - 1012^2$?

67. _____ The first three terms of a sequence are 4, 7 and 13. Each term after the first is one less than twice the previous term. What is the sixth term in the sequence?

68. _____ (meters) What is the perimeter, in meters, of triangle ADE shown here, with AB = 8 m, BC = 6 m, AC = 10 m and AE = 30 m?



69. _____ If the median of a collection of five positive integers is 26, what is the least possible value of the average of these five integers?

70. _____ (miles) At an average speed of 60 mi/h, how many miles does a car travel in 7 hours 30 minutes?

71. _____ Darren has a pepperoni pizza that is 16 inches in diameter. The pizza has 40 nonoverlapping pepperoni on it, each of which is a circle 2 inches in diameter. What fraction of the pizza's surface is covered in pepperoni? Express your answer as a common fraction.

72. _____ (permutations) How many more distinguishable permutations are there of the letters in TENTS than the letters in TENT?

73. _____ The sum of three numbers is 50 and the sum of five other numbers is 70. What is the average (or mean) of all eight numbers?

74. _____ What is the sum of the two largest divisors of 18?

75. _____ (values) For how many positive integer values of x is the value of $x^2 + 7x + 13$ between 20 and 60?

76. _____ (cm^2) What is the greatest possible area of a face of a rectangular prism with dimensions 15 cm, 10 cm and 5 cm?

77. _____ What integer c satisfies the inequality $9c > c^2 > 4c + 28$?

78. _____ What is the square root of the greatest two-digit integer whose digits have a product of 8?

79. _____ If the common fraction equivalent of $\frac{39}{15}$ is $\frac{a}{b}$ for positive integers a and b, what is $a + b$?

80. _____ If every triangle must have a blue (B) vertex, green (G) vertex and red (R) vertex, what color is the vertex with the ★?