RMSMC
Redmond Middle School Math Club

2526M - B
2025-2026 MATHCOUNTS Exam

Monday, January 12, 2026

INSTRUCTIONS

1. DO NOT BEGIN THIS EXAM UNTIL YOUR PROCTOR TELLS YOU.

2. This is a thirty question SHORT ANSWER test. All answers must be recorded in the correct location on the separate answer sheet.

3. SCORING: You will receive 1 point for each correct answer, 0 points for each problem left unanswered, and 0 points for each incorrect answer. Ties will be broken for top placement positions based on the highest numbered question answered correctly. If students are still tied, the process is repeated for the remainder of questions in reverse order. Exact ties will be broken at the sole discretion of the Math Club chair.

4. No aids are permitted other than scratch paper, graph paper, rulers, compass, protractors, and erasers. No calculators, smartwatches, or computing devices are allowed. No problems on the test will require the use of a calculator.

5. Figures are not necessarily drawn to scale.

6. Units are not necessary unless the question asks for time, where AM or PM should be specified.

7. Give all answers in simplest form, rationalizing the denominator if necessary. If you get a fractional answer, express it as a common fraction unless otherwise indicated. If the answer is dealing with money, then round to the nearest hundredth.

8. Please make sure to write your name where indicated.

9. When your proctor gives the signal, begin working on the problems. You will have 40 minutes to finish your exam.

10. When you finish the exam, please go over your answers again to check your work.

Questions for this exam were authored by Emma Li and Jian Li.

ANSWER SHEET

Name			Score 1	Score 2	Final
Grade			Initial 1	Initial 2	

Do not write in shaded regions.

	Answer	1 or 0	1 or 0
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
1-15 Total			

	Answer	1 or 0	1 or 0
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
16-30 Total			

1. If the average of the values 15, 17, 10, 8, 12, x, is 14, what is x?

2. A class of 28 students scored an average of 82 on a test. However, the teacher realized that there was an error in one of the problems, and in correcting it he gave back 6 points each to half the class, while taking away 2 points from the other half. What is the new average for the class?

3. Diane is making lemonade, using lemon juice, water, and sugar. She would like a mixture that is 1 part lemon juice, 5 parts water, and 2 parts sugar. Given that she has 3 cups of lemon juice, but an unlimited amount of water and sugar, how much lemonade, in quarts, can she make?

4. What is the slope of the line perpendicular to the line y = 2/5 x + 3 at the point (-5, 1)?

5. Coats-R-Us is having a sale. All coats are on sale for 30% off. Helen has a coupon for 30% off the sale price. What is the total percent discount Helen receives?

6. Solve for x:

$$\frac{x+3}{x-4} = \frac{5}{4}$$

7. On his first three quizzes of the quarter Morris scored 95, 82 and 89. He really wants to get at least an A- for the quarter. What is the minimum score Morris needs on the 4th and final quiz of the quarter if he wants his over-all quiz average to be at least a 91?

8. How many two-digit integers greater than 50 have the property that the sum of the digits is more than double the units digit?

9. Kristin and Benjamin own a cycle shop. They sell bicycles and tricycles. On Tuesday, they got a new shipment of cycles that needed to be assembled. In the shipment there were 28 seats and 67 wheels. How many tricycles needing assembly arrived in Tuesday's shipment?

10. How many of the integers between 10 and 200 are increased by nine when the units and tens digits are reversed?

11. Alan has exactly $5.46 made up of only pennies, nickels, dimes, quarters and half dollars. If he has an equal number of each kind of coin, how many total coins does Alan have?

12. A giant, circular clock is painted on the pavement in the parking lot of MC Middle School. The clock has a radius of 18 feet. If Ivy walks clockwise around the edge of the clock from the 2 to the 9, how many feet has she walked? Express your answer in terms of π.

13. The measures of the four angles of a particular convex quadrilateral form an arithmetic sequence, and each angle is an integral number of degrees. What is the largest possible number of degrees that one of these angles could measure?

14. The Clarke Middle School administration hired Yuankai to redo the 7th grade Monday schedule. They wanted him to decide which one of Monday's seven blocks would be red, which one would be blue, which one would be green and which one would be yellow. Yuankai thought this was a silly job, so he just randomly chose 4 blocks and which color to assign to each. What is the probability that Yuankai would end up randomly picking the same blocks and colors that Clarke already uses in the Monday schedule? Express your answer as a common fraction.

15. If four times the reciprocal of the circumference of a circle equals the diameter of the circle, then what is the area of the circle?

16. If x and y are both whole numbers, what is the largest possible value of either x or y in the equation below?

$$xy - 8x - 3y = 0$$

17. Lauren has a bottle filled with six cups of liquid that is 50% water and 50% lemon juice. Hao steals her bottle and drinks some of the mixture. He then fills the bottle back up with water. Lauren gets suspicious about the bottle and has the liquid tested at a laboratory. The lab results show that the mixture in the bottle is only 37.5% lemon juice. How many cups of the mixture did Hao drink? Express your answer as a decimal to the nearest tenth.

18. In a standard deck of 52 cards, what is the probability of drawing a king, then a diamond?

19. What is the number gotten when simplifying $\sqrt{12345678987654321}$?

20. What is the sum of the entries in row 10 of Pascal's Triangle, of which the first few rows are given as below?
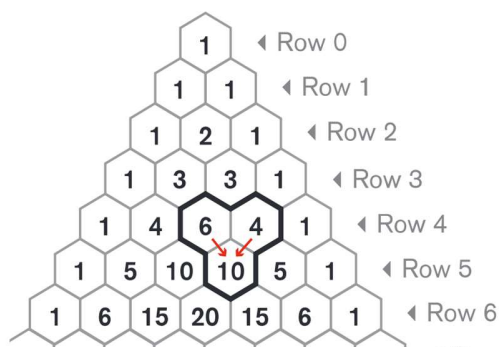
21. If a sphere has the same surface area as volume, what is its radius?

22. How many 4-digit positive integers are there in which each digit after the leftmost digit is smaller than the digit to its left?

23. In the diagram below, an equilateral triangle with side length 18 units has a circle inscribed within it. A second circle is drawn such that it is tangent to the first circle and tangent to two sides of the triangle. What is the area of the smaller circle? Express your answer in terms of π.

18
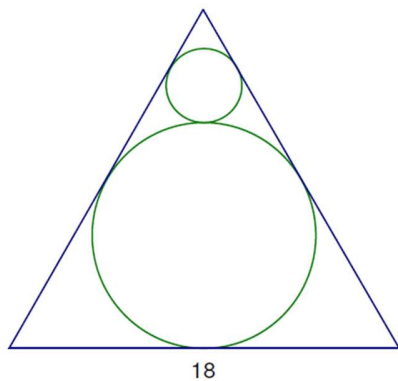
24. Katie lives on point A. Each day she walks to school (located at point B) by following the horizontal and vertical paths shown in the map below. What is the probability she passes through point C on the way to school assuming she takes one of the shortest possible paths? Express your answer as a common fraction.
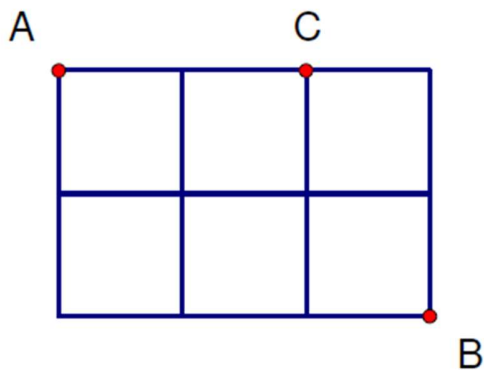
25. In the figure below, ABCD, AEHI and EFGH are all congruent squares. Points D, J, C and F are all collinear. How many degrees are in the measure of angle DJE?
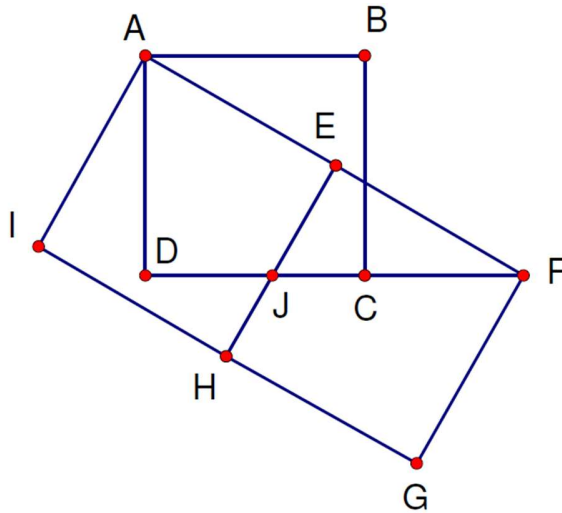
26. Stan, Fran and Luanne are all working together to build a rock wall. If Stan was working alone it would take him 18 hours. If Fran was working alone it would take her 15 hours. If Luanne was working alone it would take her 24 hours. How many hours will it take the three of them working all together? Express your answer as a mixed number.

27. At the start of the school year, Mr. Kent asked all 110 of his students which of the superhero movies they had seen over the summer. He found that 49 had seen The Aark Knight , 45 had seen Iron Man , and 30 had seen The Incredible Hulk . He also found that 5 had seen both The Aark Knight and The Incredible Hulk, 9 had seen both The Incredible Hulk and Iron Man , and 6 had seen both The Aark Knight and Iron Man. If 4 of his students did not see any of these movies, how many must have seen all 3?

28. In any 1-week period on a standard 12-hour wall clock, how many times will the hour and minute hands be pointing in the exact same direction?

29. Two boys on bicycles, 50 miles apart, begin riding towards each other. At that instant, a bee on the handlebars of one bike begins flying towards the other bike. As soon as it reaches the other handlebar, it turns around and starts flying back. The bee bounces back and forth this way until the two bikes meet. If one of the bikes goes at a constant speed of 4 miles per hour, and the other at a constant 6 miles per hour, and the bee flies at a constant 5 miles per hour, how far did the bee fly, in miles?

30. Given positive integers a, b, such that $a + b = 20$ and $ab = 91$, what is $a^2 + b^2$?