

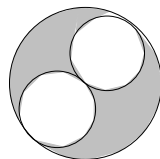
Orange County Math Circle New Year MATHCOUNTS Scrimmage
Sprint Round - Sixth Grade and Under

Name:

School:

Grade:

1. Compute: $4 + 5 - 7 \times 9 \div 3$.
2. The first place trophy of the tournament is 15 inches tall. 1 inch is approximately 2.54 centimeters. How tall is the trophy in centimeters? Express your answer as a decimal to the nearest tenth.
3. Jared has nine coins in his pocket. They all look alike, but one coin is counterfeit and weighs less than the others. What is the least number of weighings on a balance scale needed to guarantee that the counterfeit coin is found?
4. The sum of three numbers is 81 and their ratio is $3 : 7 : 17$. What is the value of the smallest number?
5. July 4, 1903, was a Tuesday. On what day of the week was July 4, 1904?
6. What is the median of the composite integers that are greater than 20 and less than 35?
7. From a bag of coins, $\frac{1}{3}$ were given to Mary, $\frac{1}{5}$ to Norm, $\frac{1}{6}$ to Anna, and $\frac{1}{4}$ to Brian. The six left were given to Troy. How many coins were originally in the bag?
8. Alex wants to provide waters and cookies for 95 students who participate in the Orange County Math Circle New Year Invitational. Water bottles are sold in packages of eight; cookies are sold in packages of ten. If he purchased the minimum number of packages of each to guarantee at least one water bottle and one cookie for each participants, how many more water bottles than cookies did he buy?
9. Two tangent congruent circles are circumscribed by a larger circle. The diameter of the larger circle is 24 cm. How many square centimeters are in the area of the shaded region? Express your answer in terms of π .



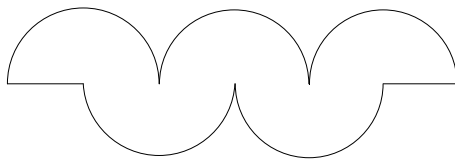
10. A four-digit number is created by using each of the digits 4, 5, 8, and 9 exactly once. What is the probability that the number will be a multiple of 4? Express your answer as a common fraction.
11. The measures of the three angles of a triangle form an arithmetic sequence. If the smallest angle measures 45 degree, what is the number of degrees in measure of the largest angle?
12. One year ago, the number of years in Jane's age was a perfect square, and one year from now, her age will be a perfect cube. How many years old is Jane?
13. Each curve in the logo is a semicircle with a radius of 8 cm. What is the area of the logo? Express your answer in terms of π ?

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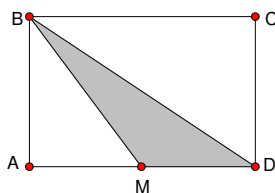
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14. What is the unit digit of 2^{48} ?
15. A car holds exactly six people, but only two of these six people can drive the car. What is the number of ways that the six people can be seated in the car on a drive?
16. The point M is the midpoint of segment BE . What percent of the area of rectangle $ABCD$ is shaded?



17. What is the least positive integer with exactly 10 factors?
18. When several thieves tried to divide a sum of money by giving \$4 to each thief, one thief received nothing. When each thief took \$3, they had \$1 left over. What is the sum of the number of dollars and the number of thieves?
19. Richard took the elevator to the 8th floor, then down 5 floors, up 10 floors, and finally down 1 floor. If those moves left Richard on the middle floor of the building, how many floors are in the building?
20. What is the sum of all positive integers less than 300 that are squares of perfect squares?
21. When N is divided by 12 the result is greater than 8. What is the least possible integer value of N ?
22. Two boys, Robert and Duke, and two girls, Olivia and Isabelle, are elected to the four student senate offices. The offices are president, vice president, secretary, and treasurer. If a boy is elected president and Olivia is elected vice-president, in how many different ways can the four students fill the four offices?
23. What is the least perfect square that is the sum of three different perfect squares, not including zero?
24. Alexander found 48 birds in a park and marked them with red ribbons. A week later, he went back to the park and noticed that 9 out of the 45 birds he saw that day were marked with red ribbons. Assuming the marked birds are equally distributed throughout the park, what is the best estimate of the number of birds in the park?

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25. Tyler grabs thirty bucks and goes to the mall with his girlfriend, Tracy. He buys her a box of chocolates. With half of the money he had left, Tracy buys herself a heart necklace. She then spent one fourth of the remainder on a dozen roses. When Tyler returns home, he finds that he has 6 dollars left. How much money did the box of chocolates cost?
26. Towers on the northern side of the pier are numbered with consecutive odd integers starting with Tower 1 closest to the pier. The distance between tower 11 and tower 21 is 700 meters. If each tower is at least 120 meters apart from its neighboring towers, what is the longest possible distance, in meters, between any two neighboring towers?
27. Halfway between $-\frac{3}{2}$ and $2\frac{1}{2}$ on a number line is what? Express your answer as a common fraction.
28. Square $EFGH$ is formed by connecting the midpoints of square $ABCD$, and $EF = 12$ units. What is the area of square $ABCD$?
29. A novel with 480 pages has about 600 words per page. Rosalie read the book at a rate of 320 words a minute. How many hours passed before she finished the book?
30. Alex, Deborah, Elissa, and Marvin each think of a single-digit prime number. It's possible that some or all of them think of the same number. What is the probability that the sum of their four numbers is 17? Express your answer as a common fraction.