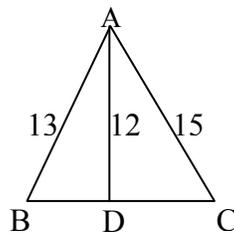




Junior High Countdown Round 11011

1. To make apple juice, you can mix water and juice mix in a 6:1 ratio by volume. If Tony wants to make 56 cups of juice, how many cups of water will he need?
2. The mean of four numbers is 15. If you remove one of the numbers, then the mean of the remaining three is 18. What number was removed?
3. The volume of a cube is equal to twice its surface area. What is the length of one of the cube's edges?
4. The sum of the first 8 terms of an arithmetic sequence is 52. If the first term of the sequence is 17, what is the 8th term?
5. If the lines $3x + 5y = 9$ and $y = x + 13$ intersect at the point (a,b) , what is the value of $a + b$?
6. What is the sum of all integer solutions to the inequality $|x + 1| \leq 4$?
7. Amber rolls two standard six-sided dice. What is the probability that the numbers she rolls have a sum greater than 10? Express your answer as a common fraction.
8. A book consists of 6 chapters, each with an even number of pages. If no two chapters have the same number of pages, what is the smallest number of pages that the book could have?
9. What is the greatest common divisor of 60 and 315?
10. In triangle ABC, altitude AD has length 12, while sides AB and AC have length 13 and 15 respectively. What is the area of ABC?

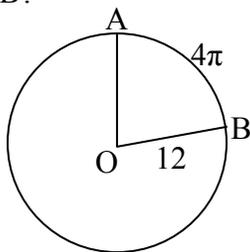


11. What is the coefficient of x^2y in the expansion of $(x + 2y)^3$?
12. Tristan can type at a rate of 32 words per minute. If he has to type up a 1200 word essay, how many minutes will it take him? Give your answer as a decimal.
13. In a class with 30 students, 17 of the students like physics and 19 like math. If 5 of the students don't like either subject, how many like both?

14. How many different 4-element subsets are there of the set $\{0, 1, 2, 3, 4\}$?
15. If you randomly choose a prime number less than 20, what is the probability that it is even? Express your answer as a common fraction.
16. What is the slope of a line perpendicular to the line $3x + 5y = 17$? Express your answer as a common fraction.
17. Lucy is twice as old as her brother. In 5 years she will be 1.5 times as old as her brother. How old is Lucy?
18. A square is inscribed in a circle. If the circle has area 16π , what is the area of the square?
19. One serving of pasta has 45 grams of carbohydrates. If $2\frac{1}{3}$ cups of pasta has 105 grams of carbohydrates, how many cups is one serving?
20. The fourth term of a geometric sequence is 12, and the common ratio is 2. If the last term of the sequence is 96, how many terms are there?
21. A dartboard consists of two concentric circles, with radii 9 and 5. What is the probability that a randomly thrown dart landing in the bigger circle will be outside of the smaller one? Express your answer as a common fraction.
22. If $2^3 \times 4^2 \times 8^5 = 16^x$, what is the value of x ? Express your answer as a common fraction.
23. There is a 30% chance of rain on Friday and 60% chance of rain on Saturday. What is the percent chance that it doesn't rain on either of these days?
24. What is the measure, in degrees, of an exterior angle of a regular octagon?
25. Carl bought a new pair of pants for \$29.68. If this price includes 6% sales tax, how much money did the pants cost before tax?
26. If the sum of three prime numbers is 38, what is the smallest of the three numbers?
27. An ice cream store has 5 flavors of ice cream and 3 types of toppings. If a sundae has 1 or 2 flavors of ice cream and 1 topping, how many different sundaes are possible?
28. If the midpoint of the line segment with endpoints $(-2,6)$ and $(4,14)$ is (a,b) , what is the value of $a - b$?
29. If the sum of two numbers is 21 and their product is 104, what is the sum of their squares?
30. A 2 inch by 2 inch tile costs \$0.35. How much would it cost to make a 2 foot by 2 foot design using these tiles?

31. How many positive integers less than 30 are divisible by 3 or 5?
32. Two cylinders are similar to each other. The first cylinder has surface area 12π and the second has surface area 108π . If the first cylinder has volume 4π , what is the volume of the second cylinder? Give your answer in terms of π .
33. If $9^{x-4} = 3^{3x-6}$, what is the value of x ?
34. In a single elimination soccer tournament, teams are eliminated if they lose a game. The tournament ends when one team is left. How many games are played in a single elimination tournament with 16 teams?
35. Annabel wants to spend 20% of her paycheck on a computer, but that would only give her 80% of what it costs. If the computer costs \$1200, how much is her paycheck?
36. A certain number is equal to twice its square. If the number is not zero, what is it? Express your answer as a common fraction.
37. A rhombus has sides of length 5. If one of its diagonals has length 8, what is its area?
38. What is the sum of the solutions to the equation $x^4 - 8x^2 + 16 = 0$?
39. If a person is equally likely to be born on any day of the week, what is the probability that 3 randomly chosen people were all born on the same day of the week?
40. If the x - and y -intercepts of the line $4x + 6y = 48$ are $(a,0)$ and $(0,b)$ respectively, what is the value of $a + b$?
41. A liter of bottled water costs \$1.25, while a liter of apple juice costs \$1.89. If Sara needs to buy 4 liters of drinks, how much will she save by buying water instead of apple juice?
42. Let $(a, b) = ab - a - b$. What is the value of $((9, 5), 2)$?
43. A rectangle has area 70, and the lengths of its sides are integers. What is the largest possible perimeter of the rectangle?
44. A bag contains 7 blue marbles and 5 red marbles. If Sean randomly picks two marbles from the bag, what is the probability that he gets one of each color? Express your answer as a common fraction.
45. What is the least common multiple of 14 and 16?
46. What is the product of all solutions of the equation $|3x - 2| = 6$? Express your answer as a common fraction.

47. What is the radius of a sphere with surface area 72π ? Express your answer in simplest radical form.
48. A burrito recipe calls for 3 cups of beans and 8 ounces of beef. If Sam uses 2 pounds of beef for his burritos, how many cups of beans will he need? (There are 16 ounces in 1 pound.)
49. A triangle has sides of length 7, 3 and x . If x is an integer, what is the sum of all possible values of x ?
50. After driving for 6 hours, a truck driver must stop and rest for 2 hours. If a driver always travels at 60 mph, how many hours will it take to complete a 600 mile trip?
51. What is the minimum possible quotient of two elements of the set $\{-3, -2, 3, 5, 6\}$?
52. A circle with center O has radius 12. If the length of minor arc AB is 4π , what is the measure, in degrees, of angle AOB?



53. How many positive factors does 36 have?
54. A ticket office gives you \$6 off the regular price of a ticket if you pay in cash. If the regular price of a ticket is \$75, what percent of this price would you save by using cash?
55. How many integer solutions are there to the inequality $-10 < x/2 \leq 3$?
56. There are 12 people at a party. If everyone at the party shakes hands with everyone else exactly once, how many handshakes will there be?
57. A trapezoid has area 143 and height 13. If one of its bases has length 5, what is the length of the other base?
58. If the 1st term of a geometric sequence is 6 and the 3rd term is 54, what is the 5th term of the sequence?
59. What is the coefficient of x^3y^2 in the expansion of $(x + y)^5$?
60. One of the interior angle of a pentagon has measure 92° . What is the average measure of the other four interior angles?
61. Stacy's car can travel 32 miles on one gallon of gas. How many gallons of gas will she use if she drives 416 miles?

62. In a game, Robert flips 5 fair coins. He wins if he gets either 2 or 3 heads. What is the probability that he wins the game? Express your answer as a common fraction.
63. What is the surface area of a rectangular solid with sides of length 7, 5 and 4?
64. Two balls and a mitt cost \$54, while 3 balls and 2 mitts cost \$94. How much does a mitt cost?
65. How many numbers between 400 and 500 are multiples of 15?
66. If 16% of the students at a school are on the math team, and the team has 24 students, how many students go to the school?
67. If the squares of two consecutive odd integers differ by 56, what is the product of the two integers?
68. The surface area of a sphere is equal to its volume. What is the diameter of the sphere?
69. How many ways are there to choose 3 people for a committee from a group of 7 people?
70. A teacher brought 32 cookies to school for her class. Every student got a cookie, and 10 students took two cookies. If $\frac{1}{8}$ of the cookies were left over, how many students are in the class?
71. If $2x + 5y = 29$ and $x = -4y$, what is the value of $2x + 2y$?
72. The distance from the point $(a,8)$ to $(3,5)$ is 5. What is the mean of all possible values of a ?
73. Jane has 44¢ worth of nickels and pennies in her pocket. If she has a total of 16 coins, how many nickels does she have?
74. What is the sum of the first 16 positive even integers?
75. A copy center charges 4¢ per page for regular copies and 25¢ per page for color copies. If Stacy needs to copy 19 pages from a textbook, and 3 of the pages need to be in color, how much will it cost?
76. It would take John 4 hours to paint a room on his own, and it would take Crystal 6 hours to do it on her own. How many minutes would it take them to paint the room if they both worked on it?
77. What is the area of a rectangle with diagonals of length 25 and one side of length 7?

78. A multiple choice question has 5 answers. The correct answer is worth 4 points. Each of the 4 wrong answers gives -1 point. If Cara chooses an answer at random, on average how many points will she get?
79. What is the value of $27^2 - 13^2$?
80. Alexa drove the 240 miles to her grandparents' house in 5 hours, and then drove another 165 miles to a friend's house in 4 hours. What was her average speed over the entire trip, in miles per hour?