

Blitz Round, Page 1

1. Three concentric circles have radii 5, 12, and 13. What is the length of the shortest line segment that contains one point on each circle? 1. \_\_\_\_\_ units
2. What is  $\frac{20^6}{40^4}$ ? 2. \_\_\_\_\_
3. Solve for  $x$ :  $\sqrt{x} + \sqrt{x} = \sqrt{15}$ . 3. \_\_\_\_\_
4. Alphonse went to the bank to get change for a \$20 bill. The change consisted of equal numbers of nickels, dimes, and quarters. How many coins did Alphonse get altogether? 4. \_\_\_\_\_ coins
5. How many points are there, both of whose coordinates are integers, on the line segment that joins the point  $(0, 0)$  to the point  $(15, 10)$ ? Include both end points in your count. 5. \_\_\_\_\_ points
6. Alfie took 5 math tests, in which possible marks ranged from 0 to 100. His average on the 5 tests was exactly 88.8. What is the lowest mark he could possibly have received on any one of the tests? 6. \_\_\_\_\_
7. What is  
 $1 + 2 - 3 - 4 + 5 + 6 - 7 - 8 + \dots - 2003 - 2004 + 2005 + 2006$ ? 7. \_\_\_\_\_

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8. Suppose that  $x \circ y = \frac{x}{y}$ . Express  $1 \circ (2 \circ (3 \circ (4 \circ 5)))$  as a fraction in lowest terms. 8. \_\_\_\_\_

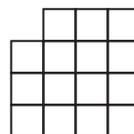
9. What is the square of 11111? 9. \_\_\_\_\_

10. A disabled person's annual pension is 10,000 dollars. How many dollars per year will her pension be after three consecutive 10% cuts? 10. \_\_\_\_\_ dollars

11. What is the least positive integer  $N$  such that  $45N$  is a perfect cube? 11. \_\_\_\_\_

12. In a triangle that contains an obtuse angle, the lengths of the sides, in increasing order, are the integers 6, 8, and  $n$ . What is the smallest possible value of  $n$ ? 12. \_\_\_\_\_

13. How many squares can be found in the figure below? The figure has been constructed using fifteen  $1 \times 1$  squares. 13. \_\_\_\_\_ squares



14. Abigail has some nickels, dimes, and quarters. The ratio of the number of dimes to the number of nickels is the same as the ratio of the number of quarters to the number of dimes. If Abigail has 12 dimes, and more quarters than nickels, what is the largest number of nickels that Abigail could have? 14. \_\_\_\_\_ nickels

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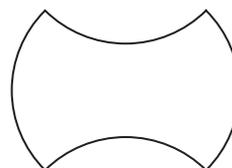
15. For every box of cereal that I buy at the regular price, I get an additional box for 1 penny. My grocery cart contained 12 boxes of cereal, for which I paid a total of \$17.88 dollars. What is the regular price (in dollars) of a box of cereal? 15. \_\_\_\_\_ dollars

16. Odin and Eve play the following game. A fair die is tossed. If the result is an odd number, Odin gets 1 point; if the result is an even number, Eve gets 1 point. The first person to get 10 points wins the game. Right now Odin has 7 points, and Eve has 9. What is the probability that Eve wins the game? Express the answer as a common fraction. 16. \_\_\_\_\_

17. What is the product of the solutions of the equation 17. \_\_\_\_\_

$$\sqrt{4 - \frac{1}{x}} = 4 - \frac{1}{x}?$$

18. The figure below is bounded by four arcs. Each is one-quarter of the boundary of a circle with radius 5. What is the number of square units in the area of the figure? 18. \_\_\_\_\_ units<sup>2</sup>



19. A train usually takes 13 hours to get from A to B. If the train's average speed is 5 km per hour less than usual, the trip takes an hour longer. What is the distance, in km, from A to B? 19. \_\_\_\_\_ km

20. A grasshopper is hopping on the number line below. If it is on a number which is not a multiple of 7, it hops to the right by 2. If it is on a multiple of 7, it hops to the left by 1. 20. \_\_\_\_\_

The grasshopper starts on the number 1. On what number is it after 100 hops?



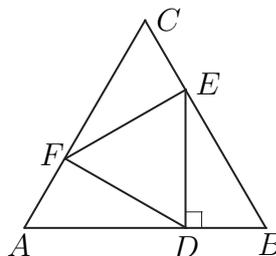
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21. A UBC graduate left two-fifths of her estate to daughter #1, two-fifths of the rest to daughter #2, and two-fifths of the rest to daughter #3. What remained was given to UBC. What fraction of the estate was given to UBC? 21. \_\_\_\_\_

22. At a meeting, there are 32 people who are not blonde, 35 who are not brown-haired, and 38 who are not black-haired. What is the largest number of people that could be at the meeting? Note that maybe there are red-haired people at the meeting. 22. \_\_\_\_\_ people

23. A student has 3 physics books, 3 chemistry books, and 3 biology books. She arranges them on a bookshelf so that books on the same subject are together. In how many ways can she do this? 23. \_\_\_\_\_ ways

24. In the following diagram,  $\triangle ABC$  and  $\triangle DEF$  are equilateral, and  $\triangle DEF$  is inscribed in  $\triangle ABC$ , with  $ED$  perpendicular to  $AB$ . Given that  $\triangle ABC$  has area 1, what is the area of  $\triangle DEF$ ? 24. \_\_\_\_\_ units<sup>2</sup>



25. What is the smallest positive fraction  $x$  such that  $\frac{x}{y}$  is an integer for both  $y = \frac{8}{21}$  and  $y = \frac{6}{35}$ ? 25. \_\_\_\_\_

26. What fraction of  $\triangle ABC$  is shaded? 26. \_\_\_\_\_

