

Bull's-eye, Page 1: Problem Solving

1. A distance of 1 cm on a map represents a distance of 5 km on the ground. A lake has area 200 km^2 . How many cm^2 should the image of the lake occupy on the map? 1. _____ cm^2
2. A cup of coffee costs \$3.00, and a muffin costs \$4.00. This week, Sabrina spent exactly \$29.00 on coffee and muffins. What is the sum of the smallest number of muffins and the largest number of muffins that Sabrina could have bought this week? 2. _____ muffins
3. Alicia's Toyota Camry uses 11.5 litres of gasoline to travel 100 km in the city, and 7.5 litres to travel 100 km on the highway. Eighty percent of the distance Alicia travels per year is in the city, and 20% is on the highway. What is the average number of litres Alicia uses to travel 100 km? Give the answer correct to 1 decimal place. 3. _____ litres
4. Alicia, Beti, and Gamay ran for Student Council president. Alicia won with 45% of the votes, Beti got 40%, and Gamay got 15%. If 20 people had switched their vote from Gamay to Beti, then Beti would have ended up with 1 more vote than Alicia. How many people voted? 4. _____ people

Bull's-eye, Page 2: Combinatorics and Numbers

5. Alicia has 6 pairs of shoes, identical except for colour: 3 of the pairs (6 shoes) are brown, 2 pairs are red, and 1 pair is green. Alicia is completely colour blind, so she picks a left shoe and a right shoe at random. What is the probability that the two shoes are of the same colour? Express your answer as a common fraction. 5. _____

6. The positive integer N is a multiple of 8. When N is divided by 25, the remainder is 9. What is the smallest possible value of N ? 6. _____

7. The positive integers a , b , and c satisfy the equation 7. _____

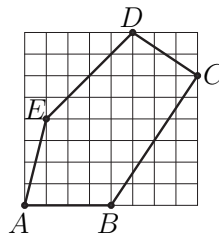
$$\frac{4}{5} = \frac{1}{a} + \frac{1}{b} + \frac{1}{c}$$

What is the largest possible value of $a + b + c$?

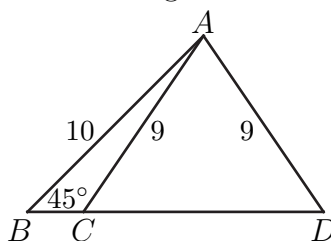
8. What is the smallest prime that divides 2047? 8. _____

Bull's-eye, Page 3: Geometry

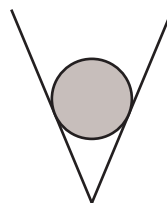
9. Each small square in the diagram below has area 1 unit². The diagram consists of 64 squares. What is the area enclosed by the 5-sided figure $ABCDE$? The points A , B , C , D , and E are all grid points.



10. In the figure below, C is on the line segment BD , and $\angle ABC$ has measure 45° . Also, we have $AB = 10$, and $AC = AD = 9$. What is the length of CD ? Express your answer in the form \sqrt{N} , where N is an integer. For example, an answer of $\sqrt{160}$ is of the right form.



11. A spherical ball of radius 2 is dropped into a cup. The cup is a right-circular cone, with the radius of the top equal to 5 and the height equal to 12. When the ball reaches as low as it can, how far is the bottom of the ball from the vertex of the cone? Express your answer as a common fraction.



12. In the trapezoid below, lines that look parallel are parallel. The trapezoid is divided into four regions by its diagonals. The areas of two of these regions are 50 cm² and 20 cm², as indicated. What is the area of the entire trapezoid?

