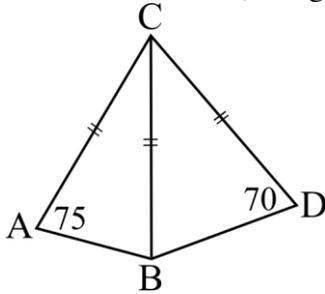


1. What is the nearest whole number to  $1 + 2.1 + 3.21 + 4.21$ ? \_\_\_\_\_ 1

2. In the figure below  $CA = CB = CD$ ,  $\angle CAB = 75^\circ$ , and  $\angle CDB = 70^\circ$ .  
 What is the value (in degrees) of  $\angle ACD$ ?



\_\_\_\_\_ (°) 2

3. If N is 15% of M and M is  $\frac{2}{5}$  of L, then N is how many percent of L? \_\_\_\_\_ (%) 3

4. Find:  $(2 - 1) + (5 - 3) + (8 - 5) + \dots + (29 - 19) =$  \_\_\_\_\_ 4

5. The circumference of a circle is  $34\sqrt{\pi}$ . What is the area of the circle? \_\_\_\_\_ 5

6. Reduce the following expression to a fraction in lowest terms:  

$$\frac{7 + 6 + 5 + \frac{18}{2}}{\frac{6}{7}} =$$
 \_\_\_\_\_ 6

7. Alan's average test score on his four tests was 81, and his average score on the first 3 tests was 76. What was his score on the fourth test? \_\_\_\_\_ 7

8. N is the smallest number larger than 2012 whose digits are all even. What is the largest prime factor of N? \_\_\_\_\_ 8

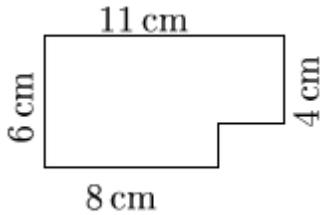
9. A regular polygon has 9 sides. How many diagonals does it have? (A diagonal is any interior line connecting two corners.) \_\_\_\_\_ 9

Grade Six (6) Division

10. Find the smallest whole number  $N$  such that  $N \times 420$  is a perfect square.  
(Perfect squares are numbers like  $4 = 2^2$ ,  $9 = 3^2$ ,  $16 = 4^2$ , etc...) \_\_\_\_\_ 10

11. Round 2012 minutes to the nearest whole number of hours. \_\_\_\_\_(hrs) 11

12. All angles in the figure below are right angles.  
What is the area (in  $cm^2$ ) of the 6-sided shape?



\_\_\_\_\_ ( $cm^2$ ) 12

13. Adam needs a minimum of 87 cheesecake slices for his year-end party. A large cake costs \$44 per cake, and can be cut into 16 slices. A small cake costs \$20 per cake, and can be cut into 6 slices. Adam wants to minimize his total cost. As long as total cost is minimized, he does not care if the total number of slices exceeds 87. What is his total cost in dollars? \_\_\_\_\_ (\$) 13

14. How many slices did Adam get in Question #13? \_\_\_\_\_ 14

15. How many integers between 100 and 1000 have no 7 in their decimal representation and have digit sum larger than 24? \_\_\_\_\_ 15

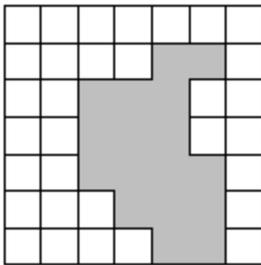
16. 100 can be written as the sum of three primes.  
What is the largest possible value of such a prime? \_\_\_\_\_ 16

17. Seven years ago, when Anne's sister was born, Anne's mom was five times Anne's age at that time. Today, the combined ages of Anne's mom and the two daughters is 51. How old is the mom now? \_\_\_\_\_(yrs) 17

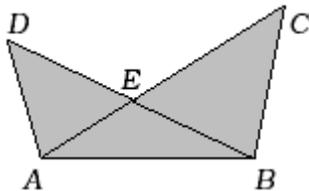
18. At the bargain shop each shirt is sold for \$5 plus tax.  
Tax on an adult shirt is 12% and tax on a kid's shirt is only 5%.  
If you have just enough money to buy 90 adult shirts (tax included),  
how many kid's shirts can you buy for the same amount? \_\_\_\_\_ 18

Grade Six (6) Division

19. Thelma and Louise compete in target shooting. Each one fires a single bullet towards a target. Thelma has probability  $\frac{1}{2}$  of hitting the target and Louise has probability  $\frac{1}{3}$  of hitting. If both hit or if both miss then neither is a winner. What is the probability that Louise wins? \_\_\_\_\_ 19
20. A new Prius car can travel 100 km on 3.7 litres of fuel. 7 years later it travels 100 km on 5.2 litres of fuel. How many km will it travel on 3.7 litres? Round your answer to the nearest km. \_\_\_\_\_(km)20
21. Twenty Lego cubes are arranged in a line (4 red, 4 green, 4 yellow, 4 blue, 3 white, and 1 black). The black cube is not at either end of the line. What is the probability that the cubes next to it on both sides are of the same color? \_\_\_\_\_ 21
22. A box-shaped container with dimensions of  $12\text{cm} \times 12\text{cm} \times 3\pi \text{ cm}$  is full of water. You pour it into a cylindrical container that has a base with radius 10cm. What is the height (in  $\text{cm}$ ) of the water level in the cylindrical container? Express your answer as a decimal correct to 2 significant digits. \_\_\_\_\_(  $\text{cm}$  )22
23. Define  $x \oplus y = x^2 + y^2$ , and  $x \# y = x + 2y$ . Find:  $(1\#2) \oplus (2\#1) =$  \_\_\_\_\_ 23
24. The figure below is a square consisting of smaller squares and a shaded region. How many squares, including all sizes are there in the figure?  
(Hint: note that squares can be of the following sizes:  $1 \times 1$ ,  $2 \times 2$ ,  $6 \times 6$ , and  $7 \times 7$ .)



- \_\_\_\_\_ 24
25. The area of triangle  $ABC$  is  $\frac{17}{14}$  of the area of triangle  $ABD$ , and  $BE = ED$ .  
If the area of  $ABE$  is 105, what is the area of  $ABC$ ?



- \_\_\_\_\_ 25
26. A room has 8 doors. Of the doors, 3 can only be used to enter the room, 3 can only be used to exit the room, and 2 can be used for entering or for exiting. Abe chooses at random a door through which he can enter, and a door through which he can exit. What is the probability that Abe enters and exits through the same door? Write your answer as a common fraction. \_\_\_\_\_ 26