

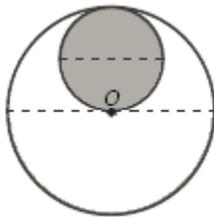
1.  $2925 \times N$  is a perfect square. What is the least value of  $N$ ?

\_\_\_\_\_ 1

2. What is the positive difference between the average and median of 16, 55, 45, 50, 11, 79, 11, and 45?

\_\_\_\_\_ 2

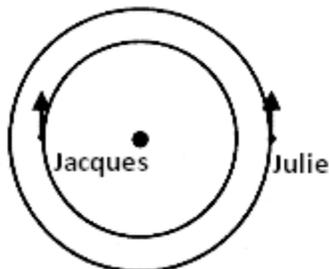
3. The two circles below are tangent. The point O is the centre of the big circle and is also on the circumference of the small circle. The area of the shaded region is  $\frac{121}{\pi}$ . What is the sum of the circumferences of both circles?



\_\_\_\_\_ 3

4. Jacques runs on the inner track. Julie runs on the outer track. The radius of the outer track is  $R$ . The radius of the inner track is  $r$ . For every 17 full circles that Julie completes, Jacques completes 19 full circles. Jacques' speed is  $\frac{29}{31}$  of Julie's speed. What is the value of  $\frac{R}{r}$ ?

Express your answer as a common fraction.



\_\_\_\_\_ 4

Grade Seven (7) Division

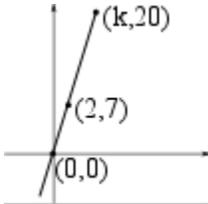
5. 11 workers build 11 cars in 11 days. How many days does it take for 100 workers to build 450 cars? Round your answer upward to the next whole number.

\_\_\_\_\_ 5

6. Jane's age on 01/01/2014 was 61. Kelly's age on 01/01/2014 was 31. For how many of the past years, was the ratio of their ages on 01 January a positive whole number?

\_\_\_\_\_ 6

7. The points  $(0,0)$ ,  $(2,7)$ , and  $(k,20)$  lie on a line. What is the value of  $k$ ? Express your answer as a common fraction.



\_\_\_\_\_ 7

8. Five boys and three girls sit at random at a round table with 8 seats. What is the probability that none of the girls sits next to another girl? Express your answer as a common fraction.

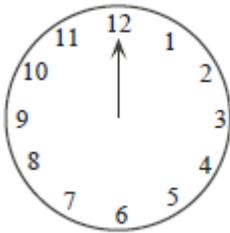
\_\_\_\_\_ 8

Grade Seven (7) Division

9. The population of South Vancouver changed from 93,000 in 2010 to 97,000 in 2011 (year end figures). It then increased by 4000 in 2012, and by additional 1000 in 2013. Over that period of 3 years, what was the total percentage change of the population?  
Round your answer to the nearest whole number.

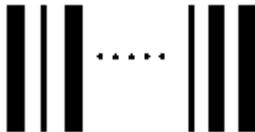
\_\_\_\_\_ (%) 9

10. The clock shows the time of 12:00 (the hour hand and the minute hand point in the same direction). How much time (in hours) passes until both hands point again in the same direction?  
Express your answer as a common fraction.



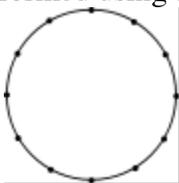
\_\_\_\_\_ (h)10

11. In the bar code below: thick black lines represent the digit 1, and thin black lines represent the digit 0 in a binary representation of a number. Please note that with all possible combinations of 5 black lines it is possible to represent up to 32 different items. How long must the bar code be (in black lines), so that it is able to represent 20 million different items?



\_\_\_\_\_ 11

12. 12 points are equally spaced on a circle. How many non-congruent trapezoids can be formed using any 4 of these 12 points as vertices?



\_\_\_\_\_ 12