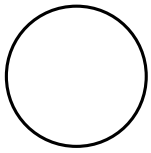
PIMS Elementary Grades Math Competition NAME: _____
3 May 2008
Sprint Round - Grade Seven Division SCHOOL: _____

1. N is 7% of 800. What is the value of 25% of N? _____ 1

2. The radius of a circle is $\frac{21}{\pi}$. What is the circumference of the circle?



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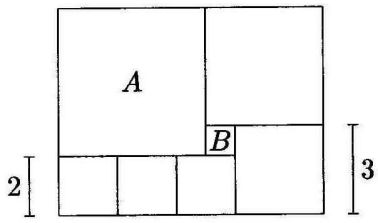
3. Two fair dice are tossed. What is the probability that the sum is greater than 10? Express the answer as a common fraction. _____ 3

4. How many minutes will pass between 4:25 PM today and 7:07 PM tomorrow? _____(minutes) 4

5. Convert the decimal number 0.65 to a fraction in lowest terms. _____ 5

6. At the post office, Diana spent a total of $2.00 to buy some 52 cent stamps and some 11 cent stamps, and received no change. How many stamps in total did Diana buy? _____(stamps) 6

7. Seven square tiles are arranged as shown in the figure to form a large rectangle. The size of two of the tiles is also shown in the figure. Tile ***A*** is the largest, and tile ***B*** is the smallest. How many tiles of size ***B*** are needed to cover the entire area covered by tile ***A***? _____(tiles) 7



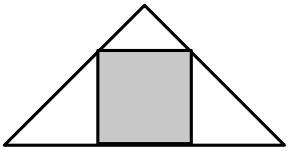
8. Simplify:
$$\frac{1}{2\times 2}\times\frac{2}{3}\times\frac{3\times 3}{4}\times\frac{4}{5}\times\frac{5}{6\times 6}$$
_____ 8

9. Let $D(x, y) = x^2 + y$. Find $D(11, 11)$. _____ 9

Grade Seven (7) Division

10. Mary's first four test marks were 95, 86, 97, and 92.
What is the lowest mark that she can get on the fifth test so that her average on the five tests will be at least 91? _____ 10

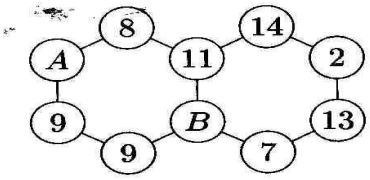
11. A square (shaded in the picture) is inscribed in an isosceles right-angled triangle. Two vertices of the square are on the hypotenuse of the triangle. Find the ratio of the area of the square to the area of the circumscribing triangle. Express your answer as a common fraction. _____ 11



12. Find the sum of all odd primes that divide 2008. _____ 12

13. What is the sum of all positive whole numbers x such that $x^2 - 15$ is a perfect square? _____ 13

14. The sum of the numbers in each of the two rings is the same. Given that ***A=B***, what is the sum in each of the rings?



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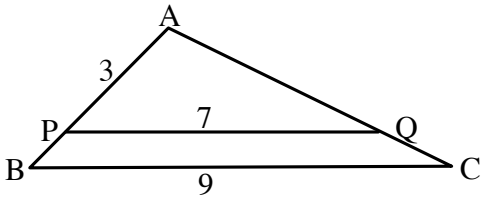
15. Two pears and three apples weigh a total of 510 grams, while three pears and two apples weigh a total of 570 grams. All apples have equal weight and all pears have equal weight. What is the weight (in grams) of one pear? _____(grams) 15

16. In the figure below, PQ is parallel to BC. Also, BC=9, PQ=7, and AP=3. What is the length of PB? Express your answer as a common fraction. _____ 16



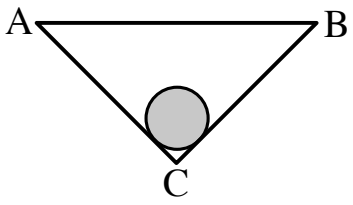
17. Bus fare is $2.50 per adult and $1.50 per child. One day, 600 people rode the bus, and paid a total of $1380 in fares. How many children rode the bus that day? _____ 17

18. $1 = 1 \times 1$, $4 = 2 \times 2$, $9 = 3 \times 3$, and thus, 1, 4, 9, and so forth are called perfect squares. Let N be the first year after 2008 that will be a perfect square, and let M be the last year before 2008 that was a perfect square. What is the value of $N - M$? _____ 18

Grade Seven (7) Division

19. Rachel's Toyota Prius uses 5.3 litres of gas per 100 km driven in the city, and 4.3 litres of gas per 100 km driven on the highway. Rachel drove 60 km in the city and 40 km on the highway.
What was her average consumption of gas (in litres per 100 km)?
Give the answer correct to one decimal place. _____ 19

20. In the figure below, ABC is an isosceles right-angled triangle (the angle at C is 90°). The circle touches AC and AB, and its area (shaded) is $\frac{16}{\pi}$.
Given that the circumference of the circle is equal to the length of AC, what is the area of the triangle ABC? _____ 20



21. All the faces of 64 identical small cubes are first painted white. Then, one big cube is made by combining all of these small cubes. All six faces of the big cube are then painted black. Among the faces of the 64 small cubes, what is the ratio of the number of black faces to the number of white faces?
Express your answer as a common fraction. _____ 21

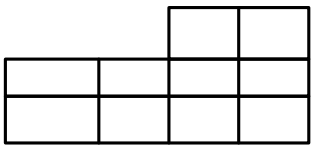
22. The ***integer*** part of a positive decimal number is the part before the decimal point. The ***fractional*** part of a positive decimal number is the part from the decimal point on. For example, the integer part of 7.9 is 7, while its fractional part is 0.9.
What is the largest number whose fractional part is equal to one-fifth of its integer part? Express your answer using decimal notation. _____ 22

23. Find the value of $\frac{a-b}{b-c}$ if $\frac{a}{b}=\frac{9}{4}$ and $\frac{b}{c}=\frac{5}{3}$.
Express your answer as a common fraction. _____ 23

24. Find the smallest prime number that has a digit sum of 20. _____ 24

25. A group of eight people, two of whom are Goby and Bogy, line up in a row at random. What is the probability that there are exactly two persons between Goby and Bogy? Express your answer as a common fraction. _____ 25

26. How many different rectangles are there altogether in the diagram?



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