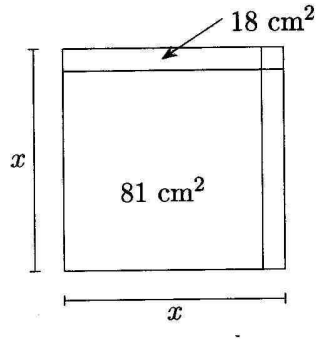
PIMS Elementary Grades Math Competition NAME: _____
3 May 2008
Target Round - Grade Five Division SCHOOL: _____

1. The square with side x has been divided into four parts as shown: two squares and two rectangles. The area of one of the rectangles is $18\,cm^2$, and the area of one of the squares is $81\,cm^2$, as shown in the figure. What is the value of x (in cm)?



_____(cm) 1

2. When the positive whole number n is divided by 7, the remainder is 4.
What is the remainder when the number $2n$ is divided by 7?

_____ 2

3. In the state of Percentia, each one of the 15 million voters voted for one of the two presidential candidates, Archimedes and Euclid. Archimedes received 750 more votes than Euclid. What percentage of the 15 million votes was for Archimedes?
Give your answer in decimal form with as many significant digits as needed.

_____(%) 3

4. Note that $6 = 2^2 + 1^2 + 1^2$ and $13 = 3^2 + 2^2 + 0^2$. So 6 and 13 can each be written as the sum of the squares of three integers. How many positive whole numbers smaller than 15 can be written as the sum of the squares of three integers?

_____ 4

Grade Five (5) Division

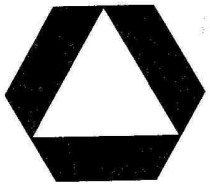
5. Adam, Bob and Charlie were hungry, so they each wanted to buy a sandwich, but none of them had enough money. Adam was short \$0.20, Bob was short \$0.30, and Charlie was short \$0.50. They pooled their money and bought two sandwiches. They were left with a total of \$1.20. What was the cost of one sandwich (in dollars)?
Express your answer using decimal notation.

_____(\$) 5

6. During a party, a cake was completely consumed by the 12 people who participated. The base of the cake was a $24\,cm$ by $24\,cm$ square, and the height of the cake was $5\,cm$.
What was the average consumption per person (in cm^3)?

_____(cm^3) 6

7. In the figure below, the vertices of the triangle are the midpoints of the sides of a regular hexagon.
What fraction of the area of the hexagon is shaded?
Express your answer as a common fraction.



_____ 7

8. How many ordered triples (x, y, z) of positive whole numbers are there such that $xyz = 10$?
Note that for example the triple (1, 1, 10) is to be considered different from the triple (10, 1, 1).

_____ 8

Grade Five (5) Division

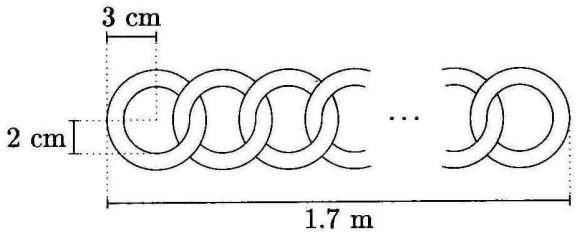
9. The combined number of apples, oranges, and bananas in a basket is N, which is greater than 90 and less than 100. The number of apples is one third of N, and the number of bananas is one fourth of N. What is the value of N?

_____ 9

10. A distance of 1 cm on a map represents a distance of 20 km on the ground. The city of London covers 6.25 cm^2 on the map. What is the area of London (in km^2)?

_____(km^2) 10

11. A chain is made out of rings as in the diagram below. The outer radius of each ring is 3 cm, and the inner radius is 2 cm. How many rings are needed to make the chain 1.7 m long?



_____(rings) 11

12. What is the sum of all positive integers that divide 120? Note that 1 and 120 divide 120.

_____ 12