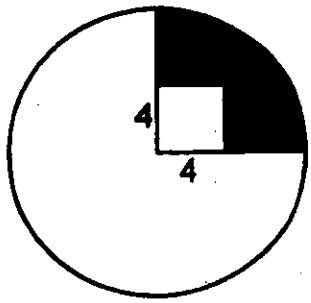
PIMS Elementary Grades Math Competition NAME: _____
30 April 2005
Target Round - Grade Seven Division SCHOOL: _____

1. The radius of the circle is 8 cm.
The side of the square is 4 cm.
Find the area of the shaded region (in cm^2)
rounded to the nearest whole number.



_____ 1

2. A solid metal pyramid with square base of area 27 cm^2 and height 48 cm is melted down to make identical cubes with side 3 cm.
How many cubes are there?

_____ 2

3. A mad professor has created a new kind of creature called a Blorg. For each Blorg, one hour after it is born, it gives birth to a new Blorg. Two hours after it is born, it gives birth to two more new Blorgs and then it immediately dies. If the professor starts with one newborn Blorg at noon, how many live Blorgs does he have at 4:30 PM that afternoon?

_____ 3

4. The number 1729 is known as Ramanujan's number. The great Indian mathematician found two different ways to write 1729 as the sum of two cubes.
Thus:
$1729 = K^3 + L^3 = M^3 + N^3$, where K, L, M, N are whole numbers and $K \neq M \neq L$.
What is the value of $K + L + M + N$?

_____ 4

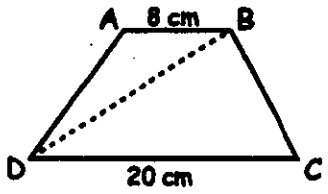
5. Which prime number between 1 and 20 is not a factor of 1492260?

_____ 5

6. Ian and Jay independently choose at random a positive whole number less than 13.
What is the probability that their numbers add up to 14 or less?
Express your answer as a common fraction.

_____ 6

7. $ABCD$ is a trapezoid ($\overline{AB}$ parallel to $\overline{CD}$).
$AB = 8\ cm$ and $CD = 20\ cm$.
The area of the triangle BCD is $105\ cm^2$.
Find the area of the trapezoid (in cm^2).



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8. For how many three-digit numbers is the sum of the digits a multiple of 9 ?

_____ 8

9. David had \$18. John had \$21. They went together to a store and bought a present for a friend. John contributed twice as much money to the cost of the present as David did. When they left the store, David had three times as much money as John. What was the cost of the present?

_____ 9

10. In the following multiplication E, M, O, and R represent 4 different digits.

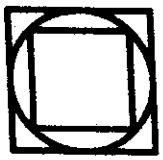
EROM
×
9

MORE

What is the value of E+M+O+R ?

_____ 10

11. A circle is inscribed in a larger square. A smaller square is inscribed in the circle. The radius of the circle is 10 cm. Find the area (in cm^2) of the region that is enclosed by the larger square but is outside the smaller square.



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12. M and N are both even positive whole numbers that satisfy $M+(M+1)+(M+2)+\cdots+(M+N-1)=100$. Find the value of $M+N$.

_____ 12