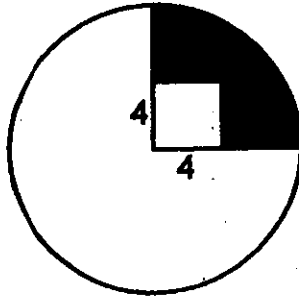1. The radius of the circle is 8 *cm*.
   The side of the square is 4 *cm*.
   Find the area of the shaded region (in cm^2)
   rounded to the nearest whole number.

_____ 1

2. A solid metal sphere of radius of 40 *cm* is melted
   down to make 64 identical small spheres.
   What will be the radius of each of the small spheres (in *cm*)?

_____ 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 $K \neq M \neq L$.
   If $K = 10$, what is the value of $M + N$?

_____ 4

5. David puts 9 balls in bag A, 10 balls in bag B, and 11 balls in bag C.
After some balls are removed from some of the bags, David notices the following:
(a) the total # of balls in bags A and B is 7,
(b) the total # of balls in bags A and C is 6,
(c) the total # of balls in bags B and C is 5.
How many balls were removed?

_____ 5

6. Ian and Jay independently choose at random a positive whole number less than 9.
What is the probability that their numbers add up to 10 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 95 cm^2.
Find the area of the trapezoid (in cm^2).
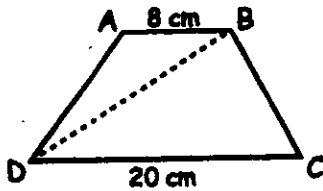
_____ 7

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

_____ 8

9. If David gives $11 to John, they will have the same amount of money. If instead, John gives $11 to David, then David will have three times as much as John. How much money do the two of them have together?

_____ 9

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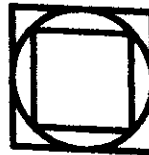
EROM

×

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.

_____ 11

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