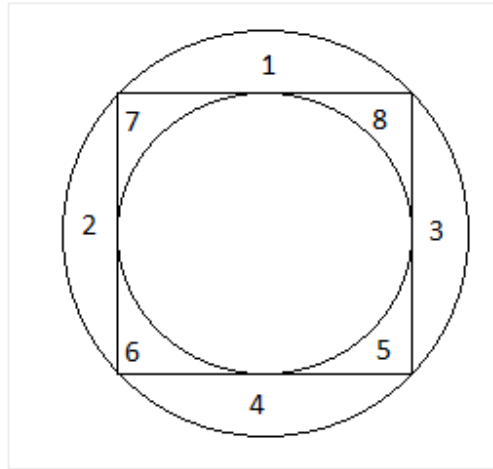


TCS previous placement questions - 26

1. Radius of the bigger circle is 1. Which area will be greater?



- a. 5
b. 4
c. Cannot be determined
d. None of these

Answer: b

Explanation:

If the radius of the bigger circle is 1, then diameter = 2 units. Which in turn equals to diagonal of square.

Let the side of the square be x . Then $x^2 + x^2 = 2^2 \Rightarrow 2x^2 = 4 \Rightarrow x = \sqrt{2}$

Now diameter of the inner circle = side of the square. So radius of the inner circle = $\frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$

Areas marked by 1, 2, 3, 4 = (Area of the circle - area of the square)/4 = $\frac{\pi(1)^2 - (\sqrt{2})^2}{4} = \frac{\pi - 2}{4} = 0.285$

Areas marked by 5, 6, 7, 8 = (Area of the square - area of the inner circle)/4 = $\frac{(\sqrt{2})^2 - \pi(\frac{1}{\sqrt{2}})^2}{4} = \frac{2 - \frac{\pi}{2}}{4} = 0.1075$

So Area marked by 4 is bigger.

2. An old man and a young man are working together in an office and staying together in a near by apartment. The old man takes 30 minutes and the young 20 minutes to walk from apartment to office. If one day the old man started at 10.00 AM and the young man at 10:05AM from the apartment to office, when will they meet?

- a. 10:15
b. 10:30
c. 10.45
d. 10:00

Answer:

Explanation:

Let the distance be 12 km. So the old man speed = $\frac{12 \text{ km}}{\frac{1}{2} \text{ hr}} = 24 \text{ kmph}$

$$\text{The young man speed} = \frac{12 \text{ km}}{\frac{1}{3} \text{ hr}} = 36 \text{ kmph}$$

As the old man started 5 minutes earlier, he covers $24 \times \frac{5}{60} = 2 \text{ km}$ in 5 minutes.

Now the time taken to the young man to meets him = $\frac{2}{36-24} \times 60 = 10 \text{ min.}$

So the time at which young man meet the old man = $10.05 + 10 = 10.15 \text{ min.}$

3. There are 16 teams divided in 4 groups. Every team from each group will play with each other once. The top 2 teams will go to the next round and so on the top two teams will play the final match. Minimum how many matches will be played in that tournament?

- a. 43
- b. 40
- c. 14
- d. 50

Answer: a

Explanation:

In each group, total matches played = ${}^4C_2 = 6$.

So total matches played in the first round = $6 \times 4 = 24$

Now top two teams from each group progress to the next round. Now these 8 teams are pooled into 2 groups. Total matches played in the second round = $6 \times 2 = 12$

Now 4 teams progress to the next round. Total matches played in the third round = 6

From this round, 2 teams progress to the next round. And final will be played between them.

Total matches = $24 + 12 + 6 + 1 = 43$

4. A sealed envelope contains a card with a single digit written on it. Three of the following statements are true and one is false.

- I. The digit is 1.
- II. The digit is not 2.
- III. The digit is not 9.
- IV. The digit is 8.

Which one of the following must necessarily be correct?

- a. II is false
- b. III is true*
- c. IV is false
- d. The digit is even.
- e. I is true

Answer: b

Explanation:

Three of the given statements are true. So both II and III are correct, and the given number is one of 1 or 8. So option b is correct.

5. How many 2's are there between the terms 112 to 375?

a. 313

b. 159

c. 156

d. 315

Answer: c

Explanation:

Let us calculate total 2's in the units place. (122, 132, 142 ... 192), (201, 212, 222, ... 292), (302, 312, ... 372) = $8 + 10 + 8 = 26$

Total 2's in tenth's place, (120, 121, 122, ..., 129) + (220, 221, ..., 229) + (320, 321, ..., 329) = 30

Total 2's in hundred's place = (200, 201, ... 299) = 100.

Total 2's between 112 and 375 = $26 + 30 + 100 = 156$

6. Ram and Shakil run a race of 2000 meters. First, Ram gives Shakil a start of 200 meters and beats him by one minute. If, Ram gives Shakil a start of 6 minutes Ram is beaten by 1000 meters. Find the time in minutes in which Ram and Shakil can run the races separately.

a. 12, 18

b. 10, 12

c. 11, 18

d. 8, 10

Answer: d

Explanation:

Let the speeds of Ram and Shakil = r and s respectively. Always remember, to solve problems involving races, try to equate the ratio of the speeds because however the two contestants run, the ratio of their speed won't change.

In the first race, Ram gives shakil a start of 200 meters. So Ram runs the entire 2000 mts, but shakil runs $(1800 - 60s)$ as Ram has beaten him by 1 min or 60 seconds.

Therefore, $\frac{2000}{1800 - 60s} = \frac{r}{s}$ --- (1)

In the second race, Ram has given shakil a start of 6 min. So shakil start his race 6 min before Ram. In 6 minutes, shakil runs $360 \times s = 360s$ mts. As Ram was beaten by 1000 mts, by that time shakil completes his race, Ram has covered 1000 mts only.

the ratio of the speeds = $\frac{2000 - 360s}{1000} = \frac{s}{r}$ --- (2)

Equating s/r in both equations, $\frac{2000 - 360s}{1000} = \frac{1800 - 60s}{2000}$

Solving we get $s = 10/3$. So time taken by shakil to cover the distance = $2000/(10/3) = 10$ minutes.

7. Three generous friends, each with some money, redistribute the money as follows: Sandra gives enough money to David and Mary to double the amount of money each has. David then gives enough to Sandra and Mary to double their amounts. Finally, Mary gives enough to Sandra and David to double their amounts. If Mary had 11 rupees at the beginning and 17 rupees at the end, what is the total amount that all three friends have?

a. 105

b. 60

c. 88

d. 71

Answer:

Explanation:

Let Sandra, David and Mary each has s , d and 11 respectively.

After the first distribution,

David has $d + d = 2d$, Mary has $11 + 11 = 22$ and Sandra has $s - d - 11$.

After the second distribution,

Sandra has $2 \times (s - d - 11)$, Mary has $2 \times 22 = 44$ and David has $2d - (s - d - 11) - 22 = 3d - s - 11$.

After the third distribution,

Sandra has $2 \times 2(s - d - 11)$, David has $2 \times (3d - s - 11)$ and Mary has $44 - 2(s - d - 11) - (3d - s - 11) = 77 - s - d$

It is given that finally Mary has Rs.17. So, $77 - s - d = 17$

$$\Rightarrow s + d = 60$$

$$\Rightarrow s + d + 11 = 60 + 11 = 71.$$

8. George walks 36 kms partly at a speed of 4 kms per hour and partly at 3 km per hour. If he had walked at a speed of 3 km per hour when he had walked at 4 and 4 km per hour when he had walked at 3 he would have walked only 34 kms. The time (in hours) spent by George in walking was

- a. 8
- b. 12
- c. 5
- d. 10

Answer: d

Explanation:

Let George walked "a" hours at 4 kmph, and "b" hours at 3 kmph.

$$\text{Given, } 4a + 3b = 36 \quad \text{--- (1)}$$

$$3a + 4b = 34 \quad \text{--- (2)}$$

Adding the above two equations and simplifying them, $a + b = 10$.

9. The sum of the four consecutive two digit odd numbers, when divided by 10, becomes a perfect square. Which of the following can be one of these four numbers?

- a. 31
- b. 25
- c. 41
- d. 67

Answer: a

Explanation:

Let the numbers be $2a + 1, 2a + 3, 2a + 5, 2a + 7$ and their sum $= 8a + 16$

Given that if this sum is divided by 10, results in a perfect square.

$$\text{So } \frac{8a + 16}{10} = k^2$$

$$\Rightarrow a = \frac{10k^2 - 16}{8}$$

$$\Rightarrow a = \frac{5(k^2)}{4} - 2$$

As k^2 is a perfect square and has to be divided by 4, only even numbers should be considered for k.

For $k = 2$, we get, $a = 3$, but $2a + 1$ is not a two digit number.

For $k = 4$, $a = 18$ for which the given condition is satisfying.

So the numbers are 37, 39, 41, 43.

For $k = 6$, $a = 43$. The numbers are 87, 89, 91, 93. But none of the options contains these numbers.

10. Consider the sequence of numbers 0, 2, 2, 4, ... Where for $n > 2$ the n th term of the sequence is the unit digit of the sum of the previous two terms.

Let s_n denote the sum of the first n terms of this sequence. What is the smallest value of n for which $s_n > 2771$?

- a. 692
b. 693
c. 694
d. 700

Answer: a

Explanation:

[0, 2, 2, 4, 6, 0, 6, 6, 2, 8, 0, 8, 8, 6, 4, 0, 4, 4, 8, 2], 0, 2, 2...this series repeats after every 20 terms.

Sum of these 20 terms = 80

So $2771 = 34 \times 80 + 51$

Sum of 13 terms = 52

So we have to use 34 times 20 terms = $34 \times 20 = 680$

$680 + 13 = 693$

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