TCS Latest Placement Paper Questions with solutions -2014 (15)

1. A man is known to speak truth 3 out of 4 times. He throws die and reports that it is a 6. The probability that it is actually a 6 is

Sol: If 6 actually appeared, he can report it with the probability of 3/4. If 6 has not appeared, still he can report it wrongly with the probability of 1/4

So the probability that it is actually a 6 = (Probability to appear 6 x His truthfulness to report + Probability to appear any other number x His lieing probability) = $\frac{1}{6} \times \frac{3}{4} + \frac{5}{6} \times \frac{1}{4} = \frac{1}{3}$

The probability that it is actually 6 = $\dfrac{\text{Probability that he reports 6}}{\text{Total probability to appear 6}} = \dfrac{\frac{3}{4} \times \frac{1}{6}}{\frac{3}{4} \times \frac{1}{6} + \frac{1}{4} \times \frac{5}{6}} = \frac{3}{8}$

2. In how many ways can we distribute 10 pencils to 4 children so each child gets atleast one pencil?

Number of ways of distributing r identical objects to n distinct objects so that each get atleast one = $^{(n-1)}C_{(r-1)}$ = $^{(10-1)}C_{(4-1)}$ = $^9C_3$

3. A drawer holds 4 red hats and 4 blue hats. what is probability of getting exactly 3 red hats or 3 blue hats when taking out 4 hats randomly out of drawer and immediately returning every hat to drawer before taking out next??

As the objects are replaced, the probability of drawing red or blue is equal.

Probability to draw exactly 3 red hats and 1 blue hat = $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{16}$

Similarly probability to draw exactly 3 blue hats and 1 red hat = $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{16}$

Total probability = $\frac{1}{16} + \frac{1}{16} = \frac{1}{8}$

4. A father purchased dress for his 3 daughters. The dresses are of same color but diff size and they are kept in dark room. what is probability that all the 3 will not choose their own dress?

This is a case of de-arrangements = $D_{n} = n! \left(\frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!} - \ldots \right)$

So number of ways that none of them chooses their own dress = $D_3 = 3! \left(\frac{1}{2!} - \frac{1}{3!} \right) = 2$

So probability = $\frac{2}{3!} = \frac{1}{3}$

5. 60% of male in a town and 70% of female in a town are eligible to vote. out of which 70% of male and 60% of female who are eligible to vote voted for candidate A. what is the value of votes in % did A get?

Let the ratio of men and women are 100 : k

Male eligible votes = 60 and female eligible votes = 70% (k)

Number of males who voted for A = 70% (60) = 42

Number of females who voted for A = 60%(70% (K) = 42% (k)

Percentage of votes got by A = $\dfrac{42 + \dfrac{42}{100}(K)}{60 + \dfrac{70}{100}(K)} \times 100 = \dfrac{4200 + 42K}{6000 + 70K} \times 100$

So this value cannot be determined as the value of K is not known

6. George and Mark can paint 720 boxes in 20 days. Mark and Harry in 24 days and Harry and George in 15 days. George works for 4 days, Mark for 8 days and Harry for 8 days. The total number of boxes painted by them is

Capacity of G + M = 720 / 20 = 36

M + H = 720 / 24 = 30

H + G = 720 / 15 = 48

Combined capacity = 2 (G + H + M) = 114

G + H + M = 114 / 2 = 57

Now capacity of G = (G+H+M) - (H + M) = 57 - 30 = 27

M = (G+H+M) - (H + G) = 57 - 48 = 9

H = (G+H+M) - (G + M) = 57 - 36 = 21

Given that G worked for 4 days, and mark for 8 and harry for 8 days

So total work by them = 4 x 27 + 8 x 9 + 8 x 21 = 348

7. Two equilateral triangle of side 12cm are placed one on top another, such a 6 pionted star is formed if the six vertices lie on a circle what is the area of the circle not enclosed by the Star?
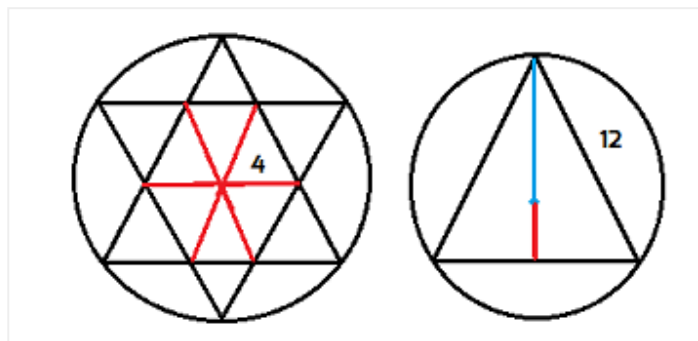
a)61

b)57

c)68

d)83

Sol: Given that two equilateral triangles of length 12 has inscribed in a circle.

Altitude of the triangle = $\dfrac{\sqrt{3}}{2}a = \dfrac{\sqrt{3}}{2}(12) = 6\sqrt{3}$

We know that centroid divides the altitude in the ratio 2 : 1 and $\dfrac{2}{3}$ (Altitude) = Circum radius

Circum radius = $\frac{2}{3}(6\sqrt{3}) = 4\sqrt{3}$

Area of the circle = $\pi r^2 = 3.14 \times (4\sqrt{3})^2$

Now the two triangles in the circle forms 12 small equilateral triangles with side 4. So their total area = $12 \times \frac{\sqrt{3}}{4} a^2$ = $12 \times \frac{\sqrt{3}}{4} 4^2$

Area which is not covered by the equilateral triangles = $3.14 \times (4\sqrt{3})^2 - 12 \times \frac{\sqrt{3}}{4} 4^2$ = 67.65 $\simeq$ 68

8. There are 4 different letters and 4 addressed envelopes.In how many ways can the letters be put in the envelopes so that atleast one letter goes to the correct address ?

a)15   b)16   c)18   d)12

Total ways of putting r letters to r covers = r! = 4! = 24

Number of ways that none of them goes into the right envolope = $D_4 = 4!(\frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!})$ = 9

So atleast one envolope goes into the right one = 24 - 9 = 15

9.There are 250men and 150 women in a committee, if all will work they will complete 12 units per day, if all men work they will complete 15 units per day, how many units will women complete per day?

I think there is a mistake in this question. If all men and women together complete 12 units, how only men can do 15 Units of work a day?

Forgetting about the reality, Women can do -3 units a day.

10. How many odd and even numbers are there between 42 and 400?? Find the sum of odd numbers and the sum of even numbers!

Sol: Odd numbers are from 43 to 399. Number of odd numbers = $\frac{l-a}{d} + 1 = \frac{399 - 43}{2} + 1 = 179$

Their sum = $\frac{n}{2}(l+a)$ = 39559

Even numbers are from 44 to 398. Number of even numbers = $\frac{l-a}{d} + 1 = \frac{398 - 44}{2} + 1 = 178$

Their sum = $\frac{178}{2}(398 + 44) = 39338$

11. The famous church in the city of Kumbakonnam has a big clock tower and is said to be over 300 years old. Every Monday 10.00 A M the clock is set by Antony, doing service in the church. The Clock loses 6 mins every hour. What will be the actual time when the faulty clock shows 3 P.M on Friday?

a. 4 AM

b.3.16 PM

c. 4.54 AM

d. 3 AM

Total time passed in the faulty clock = Monday 10 am to Friday 3 pm = 24 x 4 + 5 hours = 96 and 5 hours = 101 hrs

54 min in the faulty clock = 60 minutes of the correct clock

101 hrs in the faulcty clock = ?

$\dfrac{101}{54} \times 60$ = 112.2 Hrs.

96 Hrs + 16.2 Hrs

Friday 10 am + 16 hrs = Saturday 2am

0.2 x 60 min = 12 min

So Saturday 2.12 min AM

12. Suresh Raina and Gautam Gambhir after a scintillating IPL match decide to travel by cycle to their respective villages. Both of them start their journey travelling in opposite directions. Each of their speeds is 6 miles per hour. When they are at a distance of 50 miles, a housefly starts flying from Suresh Raina's cycle towards Gautam Gambhir at a relative speed of 17 miles per hour with respect to Raina's speed. What will be the time taken by housefly to reach Gambhir?

a. 10 hrs

b. 15 hrs

c. 20 hrs

d. 25 hrs

Sol:

Fly speed is 17 kmph w.r.t to suresh as fly is moving in opposite direction to suresh, its actual speed is 17 - 6 = 11.

Now relative speed of fly and gambhir = 11 - 6 = 5 kmph

So fly takes = $\dfrac{50}{11-6}$ = 10 Hrs