

1. Jake left point A for point B. 2 hours and 15 minutes later, Paul left A for B and arrived at B at the same time as Jake. Had both of them started simultaneously from A and B travelling towards each other, they would have met in 120 minutes. How much time (hours) did it take for the slower one to travel from A to B if the ratio of speeds of the faster to slower is 3:1?

Ans:  $x \times x$

Sol: It seems there is some problem with this question.

Let the distance between A and B is D km. As Paul is faster, take the speeds of Jake and Paul are s and 3s kmph.

As the speeds are in the ratio of 1 : 3, times taken by them should be 3 : 1. Take the times taken by them are  $3x$ ,  $x$ . But We know that  $3x - x = 2 \text{ hour } 15 \text{ min}$ . So  $2x = 9/4 \text{ hours}$ ,  $x = 9/8 \text{ hours}$ . So time taken by the slower one (Jake) takes  $3x$  time =  $3 \times 9/8 = 27/8 \text{ hours} = 202.5 \text{ minutes}$ .

(Or)

Take Jake speed = j and Paul = p kmph.

Now given that

$$\begin{aligned} \frac{D}{j} - \frac{D}{p} &= 2 \text{ hr } 15 \text{ min} = \\ \frac{2}{1} - \frac{1}{4} \text{ hrs} &= 9/4 \text{ hrs} \end{aligned}$$

Also both of them together covered D distance in 2 hours. So

$$\frac{D}{j} + \frac{D}{p} = 2$$

Adding these two equations will give us

$$\begin{aligned} \frac{2D}{j} - \frac{D}{p} &= \frac{9}{4} \\ \frac{2D}{j} + \frac{D}{p} &= 2 \\ \frac{4D}{j} &= \frac{17}{4} \\ \frac{4D}{j} &= 4 \text{ hours } 15 \text{ minutes.} \end{aligned}$$

So in the above problem, some part is redundant.

2. A completes a work in 2 days, B in 4 days, C in 9 and D in 18 days. They form group of two such that difference is maximum between them to complete the work. What is difference in the number of days they complete that work?

Ans:  $14/3 \text{ days}$ .

Sol: If C and D form a pair and A and B form a pair the difference is maximum.

Now C and D together can complete the work =

9

$\times$   
 18  
 9  
 $+$   
 18

= 6 days.

A and B together can complete the work =

2  
 $\times$   
 4  
 2  
 $+$   
 4

=  $\frac{4}{3}$  days.

Difference =  $6 - \frac{4}{3} = \frac{14}{3}$  days.

3. How many 4 digit numbers contain number 2.

- a. 3170
- b. 3172
- c. 3174
- d. 3168

Ans: D

Sol:

Total number of 4 digit numbers are 9000 (between 1000 and 9999).

We find the numbers without any two in them. So total numbers are  $8 \times 9 \times 9 \times 9 = 5832$

So numbers with number two in them =  $9000 - 5832 = 3168$

4. How many three digit numbers abc are formed where at least two of the three digits are same.

Ans: 252

Sol:

Total 3 digit numbers =  $9 \times 10 \times 10 = 900$

Total number of 3 digit numbers without repetition =  $9 \times 9 \times 8 = 648$

So number of three digit numbers with at least one digit repeats =  $900 - 648 = 252$

5. How many kgs of wheat costing Rs.24/- per kg must be mixed with 30 kgs of wheat costing Rs.18.40/- per kg so that 15% profit can be obtained by selling the mixture at Rs.23/- per kg?

Ans: 12

Sol:

S.P. of 1 kg mixture = Rs.23. Gain = 15%.

C.P. of 1 kg mixture =  $\text{Rs.}[(\frac{100}{115}) \times 23] = \text{Rs.}20$

Let the quantity of wheat costing Rs.24 is x kgs.

Using weighted average rule =

$\times$   
 $\times$   
 24  
 $+$   
 30  
 $\times$   
 18.4  
 $\times$   
 $+$   
 30  
 $=$   
 20

Solving we get  $x = 12$

6. What is the next number of the following sequence

7, 14, 55, 110, ....?

Ans: 121

Sol:

Next number = Previous number + Reverse of previous number

So

7,  $7+7=14$ ,  $14+41 = 55$ ,  $55+55 = 110$ ,  $110+011 = 121$

7. How many numbers are divisible by 4 between 1 to 100

Ans: 24

Sol: There are 25 numbers which are divisible by 4 till 100. ( $100/4 = 25$ ). But we should not consider 100 as we are asked to find the numbers between 1 to 100 which are divisible by 4. So answer is 24.

8.

(  
11111011  
)

2  
=

(  
)  
8

Ans: 373

Sol:

11111011  
)

2  
=

(  
251  
)

10  
=

(  
373  
)

8  
or

You can group 3 binary digits from right hand side and write their equivalent octal form.

9. There are 1000 junior and 800 senior students in a class. And there are 60 sibling pairs where each pair has 1 junior and 1 senior. One student is chosen from senior and 1 from junior randomly. What is the probability that the two selected students are from a sibling pair?

Ans:  $714 / 80000$

Sol:

Junior students = 1000

Senior students = 800

60 sibling pair =  $2 \times 60 = 120$  student

One student chosen from senior =

800

C

1

=800

One student chosen from junior=

1000

C

1

=1000

Therefore, one student chosen from senior and one student chosen from junior  $n(s) = 800 \times 1000 = 800000$

Two selected students are from a sibling pair  $n(E) =$

120

C

2

=7140

therefore,  $P(E) = n(E) / n(S) = 7140 / 800000 = 714 / 80000$

10.  $161?85?65?89 = 100$ , then use + or - in place of ? and take + as m, - as n then find value of m-n.

Ans: - 1

Sol:

$161 - 85 - 65 + 89 = 100$

so m's = 1, n's = 2  $\Rightarrow (m - n) = - 1$

11. In a cycle race there are 5 persons named as J, K, L, M, N participated for 5 positions so that in how many number of ways can M finishes always before N?

Ans: 60

Sol: Total number of ways in which 5 persons can finish is  $5! = 120$  (there are no ties)

Now in half of these ways M can finish before N.

12. Rahul took a part in cycling game where  $1/5$  ahead of him and  $5/6$  behind him excluding him. Then total number of participants are

Ans: 31

Sol:

Let the total no of participants including Rahul = x

Excluding rahul =  $(x-1)$

1

5

(

x

-

1

)

+

5

6

(

x

-

1

)

= x

$31x - 31 = 30x$

Total no. of participants  $x = 31$

13. If a refrigerator contains 12 cans such that 7 blue cans and 5 red cans. In how many ways can we remove 8 cans so that atleast 1 blue can and 1 red can remains in the refrigerator.

Ans:

Sol:

Possible ways to draw 8 balls from the refrigerator which contains atleast 1 blue

and 1 red can after the drawing are (6,2) (5,3) (4,4).

For (6, 2) =

$\Rightarrow$

$${}^7C_6 \cdot {}^5C_2$$

$\Rightarrow$

$$7 \cdot 10 = 70$$

For (5, 3) =

$\Rightarrow$

$${}^7C_5 \cdot {}^5C_3$$

$\Rightarrow$

$$21 \cdot 10 = 210$$

For (4, 4) =

$\Rightarrow$

$${}^7C_4 \cdot {}^5C_4$$

$\Rightarrow$

$$35 \cdot 5 = 175$$

So Total ways =  $70 + 210 + 175 = 455$

14. There are 16 people, they divide into four groups, now from those four groups select a team of three members, such that no two members in the team should belong to same group.

Ans: 256

Sol:

We can select any three of the 4 groups in

${}^4C_3$

$= 4$

ways.

Now from each of these groups we can select 1 person in 4 ways.

So total ways =  $4 \times 4 \times 4 \times 4 = 256$

15. How many five digit numbers are there such that two left most digits are even and remaining are odd and digit 4 should not be repeated.

Ans: 2375

Sol:

We have

4 cases of first digit {2,4,6,8}

5 cases of second digit {0,2,4,6,8}

But 44 is one case we have to omit. So total ways for leftmost two digits are  $4 \times 5 - 1 = 19$

5 cases of third digit {1,3,5,7,9}

5 cases of fourth digit {1,3,5,7,9}

5 cases of fifth digit {1,3,5,7,9}

So total ways =  $19 \times 5 \times 5 \times 5 = 2375$

16. 7 people have to be selected from 12 men and 3 women, Such that no two women can come together. In how many ways we can select them?

Ans: 2772

Sol:

We can select only one woman, and remaining 6 from men.

So

${}^{12}C_6$

$\times$

${}^3C_1$

$=$

${}^{12}C_6$

$\times$

${}^3C_1$

$=$

2772

17. Tennis players take part in a tournament. Every player plays twice with each of his opponents. How many games are to be played?

Ans: 210

Sol:

We can select two teams out of 15 in

$^{15}C_2$

ways.

So each team plays with other team once. Now to play two games, we have to conduct

$^{15}C_2$

$\times 2$

$= 210$

games.

18. Find the unit digit of product of the prime number up to 50 .

Ans: 0

Sol: No need to write all the primes upto 50. There are two primes 2, 5 gives unit digit of 0. So the entire product has unit digit 0.

19. If  $[x^{(1/3)}] - [x^{(1/9)}] = 60$  then find the value of x.

Ans:

4

9

Sol:

Let  $t =$

$x^{1/9}$

$\Rightarrow$

$t^9 = x$

$\Rightarrow$

$t^3 - t = 60$

So,

$t^3 - t = 60$

$\Rightarrow$

$t(t^2 - 1) = 60$

$\Rightarrow$

$t(t-1)(t+1) = 60$

$\Rightarrow$

$t = 4$

therefore,  $t =$

$x^{1/9} = 4$

$\Rightarrow$

$x = 4^9$

$\Rightarrow$

$x = 262144$

hence,  $x =$

4

9

20. A family X went for a vacation. Unfortunately it rained for 13 days when they were there. But whenever it rained in the mornings, they had clear afternoons and vice versa. In all they enjoyed 11 mornings and 12 afternoons. How many days did they stay there totally?

Ans: 18

Sol:

Total they enjoyed on 11 mornings and 12 afternoons = 23 half days

It rained for 13 days. So 13 half days.  
So total days =  $(13 + 23) / 2 = 18$