PERMUTATIONS & COMBINATIONS

NOTE:

1. PERMUTATION 🡪 ARRANGE/ POSSIBLE WAYS
2. COMBINATION 🡪 SELECT/CHOOSE
3. nCr = n!/(n-r)!\*r!
   1. For example: 5C3 🡺 5!/(5-3)! \* 3! = 120/2 \* 6 = 120 /12 = 10
   2. Shortcut : 5C4 🡺 5\*4\*3\*2/1\*2\*3\*4 = 5
4. nPr = n!/(n-r)!
   1. for example: 5P3 🡺 5!/2! = 120/2 = 60
   2. shortcut : 5P3 🡺 5\*4\*3 = 60

Problem:

1. Possible ways 🡺 Permutations
2. Repetition is not allowed 🡺 nP1 = n!
3. Repetition is allowed 🡺 nr
4. Word or number is repeated (not repetition) 🡺 MADAM (possible ways)

MADAM 🡺 5 letters = 5!

M,A 🡺 repeated twice = 2!,2!

Possible Ways = 5!/2!\*2! = 120/4 = 30 ways

1. How many ways Sangeeta, Arthi, Pooja, Mona and payal can stand in a queue?

\_s\_ \_a\_ \_p\_ \_m\_ \_p\_ 🡺 5 people = 5! = 120 ways

Possible ways = 5P1 = 5 \* 4 \* 3 \* 2 \* 1 = 120 ways

1. If nC5=nC6 what of the value of 15Cn

A.1365

B.151

C.11

D.111

nC5 = n!/(n-5)! \* 5! = n!/(n-6)! \*6! =nC6

(n-6)! \* 6 \* 5! = (n-5)! \* 5!

(n-6)! \* 6 = (n-5)!

(n-6)! \* 6 = (n-5) \* (n-6)!

6/n-5 = 1

6 = n-5 🡺 n = 11

15C11 = 15!/(4!) \*(11)! = 1365

1. There area two bags A and B. A contains 6 red flowers and 3 pink flowers. Whereas bag B contains 2 red flowers and 7 pink flowers. One flower is chosen from a bag randomly. What is the probability that the flower chosen is pink?

A)4/9

B)1/3

C)5/4

D)5/9

Probability = required sample/total sample = n(E)/n(S)

Total number of flower = 6 + 3 + 2 + 7 = 18 flowers

Pink flower = 3 + 7 = 10

Probability = 10C1/18C1 = 10 / 18 = 5 / 9

Probability = 5/9

1. In how many ways can three leads be selected out of 5 males and 4 females if at least one female must be selected?

A) 9P3

B) 9C3

C) 4C2 5C1

D) 74

E) 70

3 members to be selected 🡺 5 + 4 = 9 people

Required sample 🡺 At least 1 female

At least 1 🡺 1 or more than that

At most 🡺 1 or less than that

1. 1 Female and 2 Male (4C1 \* 5C2) or
2. 2 Female and 1 Male (4C2 \* 5C1) or
3. 3 Female and 0 Male (4C3 \* 5C0)

Required sample = 4C1 \* 5C2 + 4C2 \* 5C1 + 4C3 \* 5C0

= (4 \* 10) + 30 + 4 = 74 ways

1. A written exam consists of 6 questions with the answer options as yes/ no / none. In how many ways can the examinees select the answers?

a) 6P3 ways

b) 6c3 ways

c) 3c1. 3c1. 3c1. 3c1. 3c1

d) (3C1)6

6. How many three digits numbers can be formed using 2,3,4 and 5 with none of the digits being repeated?

A)20

b) 45

c) 24

D) 10

2,3,4,5 🡺 4 Digits

\_2ways\_| \_3ways\_| \_4ways\_ 🡺 3 digits

Possible ways = 4 \* 3 \* 2 = 24 Ways

1. Sara has 400 marbles. If she gives (1/5)th of her marbles to Sam and Sam gives (3/4)th of his marbles to David, then how many marbles does Sam have?

A) 80

B) 20

C) 60

D) 200

Total = 400 marbles

To Sam = 1/5th of 400 = 80 marbles

To David = 3/4th of 80 = 60 marbles

Sam = 80 - 60 = 20 marbles

1. If a coin with heads is tossed , then the probability of obtaining a tail is :

A) 0

B) ½

C) 1/3

D) 1

Coin (n(S)) = Head/Tail = 2

Probability = ½

1. In a quiz competition, the host asked a question & provided 3 possible answers. what is probability that the answer choice which rohit selects for question wrong?

A) 1/3

B) 1/2

C) 3c1X3/2

D) 2/3

Wrong Answer 🡺 2

Possible Answer 🡺 3

Probability = 2 / 3

1. 10 scooters, 5 motorcycles and 15 cars are parked in the parking area of a market What is the probability that a scooter will leave the parking first?

A) 1/6

B) 1/2

C) 3/5

D) 1/3

Total = 10 + 5 + 15 = 30 Vehicles

Scooters (Required Sample) = 10C1

Total sample = 30C1

Probability = 10C1/30C1 = 10/30 = 1/3

1. From the word abcd , how many ways are there to form permutation and combination of that words?

a. 24,4

b. 22,2

c. 26,6

d. 23,3

11. What is the value of 15C13?

a. 101

b. 102

c. 103

d. 104

e. 105

nCr = nC(n-r)

5C2 = 5 \* 4 / 1 \* 2 = 10

5C(5-2) = 5C3 = 5 \* 4 \* 3 / 1 \* 2 \* 3 = 10

15C13 = 15C (15-13) =15C2 = 15 \* 14 / 1 \* 2 = 105

1. What is the combination of 3 balloons from a packet of 25 balloons are

a. 2400

b. 2500

c. 2300

d. 2600

25C3 🡺 25 \*24 \*23/1\*2\*3 = 2300

Answer : 2300

1. 12 members were present at a board meeting. Each member shook hands with all of the other members before & after the meeting. How many handshakes were there?

a. 130

b. 134

c. 132

d. 135

12C2 = 12 \* 11 / 1 \* 2 = 66 🡪 Before meeting

12C2 = 12 \* 11 / 1 \* 2 = 66 🡪 After meeting

66 + 66 = 132

1. Out of 5 boys and 5 girls, a group of 5 has to be formed containing at least 3 boys, In how many ways can this be done?

a. 100

b. 120

c. 25

d. 126

3 boys and 2 girls (5C3 \*5C2) or

4 boys and 1 girl (5C4 \* 5C1) or

5 boys and 0 girl (5C5 \* 5C0) or

Possible ways = 10 \* 10 + 5 \* 5 + 1 \* 1 = 100 +25 +1 = 126 ways

AVERAGES

1. The average of 7 numbers is 50. The average of first three of them is 40, while is the average of the last three is 60. What must be the remaining number?

A) 60

B) 55

C) 50

D) 45

A,B,C,D,E,F,G 🡪 7 NUMBER

AVERAGE = SUM OF THE NUMBER/QUANTITY

(A+B+C+D+E+F+G)/7 = 50

A+B+C+D+E+F+G = 350

A+B+C/3 = 40 🡺 A+B+C = 120

E+F+G/3 = 60 🡺 E+F+G = 180

120 + D +180 = 350

300 + D = 350 🡺 D = 50

1. The number 2594\* is completely divisible by 6. The smallest value of \* can be:

A) 0

B) 2

C) 4

D) 6

2594\* 🡺 DIVISIBLE BY 6 = DIVISIBLE BY 2 & 3

2 + 5 + 9 + 4 + X = 20 + X = 24

ANSWER: 4

1. The average age of the state level cricket team of eleven is 22 years . The average age gets increased by 1 year when the coach is added. What is the coach‘s age ?

a. 34

b. 23

c. 30

d. 60

Average Age of 11 people = 22 years

Sum of 11 people = 22 \*11 = 242

Add coach = 23 years

Average of 12 people = 23 years

Sum of the 12 people = sum of 11 people + Coach Age

= 23 \* 12 = 276

Coach Age = 276 – 242 = 34 years

1. In a match , awards are given to each of 11 members of the team and a trophy to the team. In all winning team gets 2.75kg weight awards, if the weight of match winning trophy is 1.275 kg. What is the weight of the award given to each player?

a. 200 grams

b. 150grams

c. 124 grams

d. 134 grams

total weight = 2.75 kg = 2750 grams

Trophy weight = 1.275 kg = 1275 grams

Weight of 11 awards = 2750 – 1275 = 1475 grams

Each player Award weight = 1475/11 = 134 grams

1. To clear a competition, Sonu needs an average score of 90 in three exams. His score in first two exams are 93 and 85. What score must he get in the third exam to clear the competition?

a. 90

b. 85

c. 95

d. 92

a + b + c / 3 = 90

93 + 85 + X /3 = 90

93 + 85 + X = 270 🡺 178 + X = 270

X = 92

1. Rahul played well this season, his current batting average is 51. If he scores 78 runs in today‘s match his batting average will become 54, how many matches has he played in this season?

a. 8

b. 10

c. 9

d. 6

sum1/X = 51

sum1 + 78 /X+1 = 54

sum1 = 51X 🡪(i)

sum1 + 78= 54(X + 1)

sum1 = 54(X+1) – 78 🡪 (ii)

51X = 54(X+1) – 78

51X = 54X + 54 -78

3X = 24 🡺 X = 8

Total Matches = X + 1 = 8 + 1 = 9

1. If Mini downloads three more songs in her mobiles, she will have songs with 512MB in her mobile. If on an average each songs is 4 MB, how many songs did she initially have in her phone before downloading?

a. 125

b. 128

c. 120

d. 137

512/X = 4 🡺 X = 128 songs

128 – 3 = 125 songs

Initially mini has 125 songs