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Assignment - 4 Permutation and Combination

Solution 1 \rightarrow Out of eight cities one city are fixed and salesman visit other remaining 7 cities.

$$\text{possible order} \Rightarrow 7! = 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 \\ \Rightarrow 5040 \text{ "Ans."}$$

Solution 2 \rightarrow we select the 6 crew out of 30 people for first mission to Mars.

$$\text{number of ways:} - {}^{30}C_6 \Rightarrow \frac{30!}{24! \times 6!} \\ \Rightarrow \frac{30 \times 29 \times 28 \times 27 \times 26 \times 25}{6 \times 5 \times 4 \times 3 \times 2 \times 1}$$

$$\Rightarrow 29 \times 7 \times 9 \times 13 \times 25$$

$$\Rightarrow 593775 \text{ "Ans."}$$

Solution 3 \rightarrow out of starting 5 chairs occupied by 3 women and remaining are occupied by 4 boys.

$$\Rightarrow {}^5C_3 \times {}^4C_4 \Rightarrow \frac{5!}{3! \times 2!} \times \frac{4!}{0! \times 4!}$$

$$\Rightarrow \frac{5 \times 4^2}{2} \times 1 \Rightarrow 10 \text{ ways, "Ans"}$$

Solution 4 > There are total 8 runners out of which top three winners are selected and it average them.

$$\Rightarrow {}^8C_3 \times 3!$$

$$= \frac{8!}{5! \times 3!} \times 3! \Rightarrow \frac{8 \times 7 \times 6 \times 5!}{5!} \Rightarrow 336 \text{ ways, "Ans"}$$

Solution 5 > For a 4-digit password creation out of 0 to 9 digits required ways are.

$$\Rightarrow {}^{10}C_4 \times 4!$$

$$\Rightarrow \frac{10!}{6! \times 4!} \times 4! \Rightarrow \frac{10 \times 9 \times 8 \times 7 \times 6!}{6!}$$

$$\Rightarrow 10 \times 9 \times 8 \times 7 = 5040 \text{ "Ans"}$$

Solution 6 > 2 scoops of ice-cream are chosen out of 5 different icecream flavour.

$$\Rightarrow {}^5C_2 = \frac{5!}{3! \times 2!} \Rightarrow \frac{5 \times 4^2}{2}$$

$$\Rightarrow 10 \text{ "Ans"}$$

Solution 7 → Case 1: represent all 5 student in a line

$$5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$$

Case 2: → when Alice and Bob ~~too~~ stand together in a line then,

$$4! \times 2! \Rightarrow 4 \times 3 \times 2 \times 2 \\ \Rightarrow 48$$

when Alice and Bob refuse to stand next to each other then,

$$\Rightarrow 5! - (4! \times 2!)$$

$$\Rightarrow 120 - 48$$

$$\Rightarrow 72 \text{ ways Ans}$$