

* State if each scenario involves a permutation or combination.

1. The batting order for seven players on a 12 person team.

$$\rightarrow \text{Permutation } (12P_7)$$

2. Rob and Mary are planning trips to nine countries this year. There are 13 countries they would like to visit. They are deciding which countries to skip.

$$\rightarrow \text{Combination } (13C_9)$$

3. There are 45 applicants for three Computer Programmer positions.

$$\rightarrow \text{Combination } (45C_3)$$

* State if each scenario involves a permutation or combination. Then find the number of possibilities and provide solutions.

1. Combination (mC_3) $mC_3 = \frac{m!}{(m-3)!3!} = \frac{m \cdot (m-1) \cdot (m-2) \cdot m!}{(m-3)!3!} = \frac{m \cdot (m-1) \cdot (m-2)}{6} = 680$

2. Permutation $(10P_3)$ $10P_3 = \frac{10!}{(10-3)!} = \frac{10 \cdot 9 \cdot 8 \cdot 7!}{7!} = 720$

3. Permutation $(15P_4)$ $15P_4 = \frac{15!}{(15-4)!} = \frac{15 \cdot 14 \cdot 13 \cdot 12 \cdot 11!}{11!} = 32,760$

4. Combination $(110C_2)$ $110C_2 = \frac{110!}{(110-2)!2!} = \frac{110 \cdot 109 \cdot 108!}{108!2!} = \frac{11,990}{2} = 5,995$

5. Permutation $(45P_3)$ $45P_3 = \frac{45!}{(45-3)!} = \frac{45 \cdot 44 \cdot 43 \cdot 42!}{42!} = 85,140$