

Mathematics

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(Chapter – 7) (Permutations and Combinations)

(Class – XI)

Exercise 7.2

Question 1:

Evaluate (i) $8!$

(ii) $4! - 3!$

Answer 1:

(i) $8! = 1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 = 40320$

(ii) $4! = 1 \times 2 \times 3 \times 4 = 24$

$3! = 1 \times 2 \times 3 = 6$

$\therefore 4! - 3! = 24 - 6 = 18$

Question 2:

Is $3! + 4! = 7!$?

Answer 2:

$3! = 1 \times 2 \times 3 = 6$

$4! = 1 \times 2 \times 3 \times 4 = 24$

$\therefore 3! + 4! = 6 + 24 = 30$ $7! = 1 \times 2 \times 3$

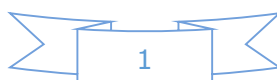
$\times 4 \times 5 \times 6 \times 7 = 5040$ $\therefore 3! + 4! \neq 7!$

Question 3:

Compute $\frac{8!}{6! \times 2!}$

Answer 3:

$$\frac{8!}{6! \times 2!} = \frac{8 \times 7 \times 6!}{6! \times 2 \times 1} = \frac{8 \times 7}{2} = 28$$



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Question 4:

If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$, find x .

Answer 4:

$$\begin{aligned}\frac{1}{6!} + \frac{1}{7!} &= \frac{x}{8!} \\ \Rightarrow \frac{1}{6!} + \frac{1}{7 \times 6!} &= \frac{x}{8 \times 7 \times 6!} \\ \Rightarrow \frac{1}{6!} \left(1 + \frac{1}{7} \right) &= \frac{x}{8 \times 7 \times 6!} \\ \Rightarrow 1 + \frac{1}{7} &= \frac{x}{8 \times 7} \\ \Rightarrow \frac{8}{7} &= \frac{x}{8 \times 7} \\ \Rightarrow x &= \frac{8 \times 8 \times 7}{7} \\ \therefore x &= 64\end{aligned}$$

Question 5:

Evaluate $\frac{n!}{(n-r)!}$, when

(i) $n = 6, r = 2$

(ii) $n = 9, r = 5$

Answer 5:

(i) When $n = 6, r = 2$: $\frac{n!}{(n-r)!} = \frac{6!}{(6-2)!} = \frac{6!}{4!} = \frac{6 \times 5 \times 4!}{4!} = 30$

(ii) When $n = 9, r = 5$: $\frac{n!}{(n-r)!} = \frac{9!}{(9-5)!} = \frac{9!}{4!} = \frac{9 \times 8 \times 7 \times 6 \times 5 \times 4!}{4!}$
 $= 9 \times 8 \times 7 \times 6 \times 5 = 15120$

