Exercise 7.2

Question 1:

Evaluate

(i) 8! (ii) 4! – 3!

Answer

(i) 8! = 1 × 2 × 3 × 4 × 5 × 6 × 7 × 8 = 40320

(ii) 4! = 1 × 2 × 3 × 4 = 24

3! = 1 × 2 × 3 = 6

∴4! – 3! = 24 – 6 = 18

Question 2:

Is 3! + 4! = 7!?

Answer

3! = 1 × 2 × 3 = 6

4! = 1 × 2 × 3 × 4 = 24

∴3! + 4! = 6 + 24 = 30

7! = 1 × 2 × 3 × 4 × 5 × 6 × 7 = 5040

∴ 3! + 4! ≠ 7!

Question 3:

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

Answer

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

Question 4:

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

Answer

$$\frac{1}{6!}+\frac{1}{7!}=\frac{x}{8!}$$

$$\Rightarrow \frac{1}{6!}+\frac{1}{7\times 6!}=\frac{x}{8\times 7\times 6!}$$

$$\Rightarrow \frac{1}{6!}\left(1+\frac{1}{7}\right)=\frac{x}{8\times 7\times 6!}$$

$$\Rightarrow 1+\frac{1}{7}=\frac{x}{8\times 7}$$

$$\Rightarrow \frac{8}{7}=\frac{x}{8\times 7}$$

$$\Rightarrow x=\frac{8\times 8\times 7}{7}$$

$$\therefore x=64$$

Question 5:

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

(i) $n = 6$, $r = 2$ (ii) $n = 9$, $r = 5$

Answer

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

$=9\times 8\times 7\times 6\times 5=15120$