



Permutations Ex 16.3 Q9

We have,

$$P(n-1, 3) : P(n, 4) = 1 : 9$$

$$\Rightarrow \frac{P(n-1, 3)}{P(n, 4)} = \frac{1}{9}$$

$$\Rightarrow \frac{\frac{(n-1)!}{(n-1-3)!}}{\frac{n!}{(n-4)!}} = \frac{1}{9}$$

$$\Rightarrow \frac{(n-1)! \times (n-4)!}{(n-4)! \times n!} = \frac{1}{9}$$

$$\Rightarrow \frac{(n-1)}{n!} = \frac{1}{9}$$

$$\Rightarrow \frac{(n-1)!}{n \times (n-1)!} = \frac{1}{9}$$

$$\Rightarrow \frac{1}{n} = \frac{1}{9}$$

$$\Rightarrow n = 9$$

Hence,  $n = 9$

We have,

$$P(2n-1, n) : P(2n+1, n-1) = 22 : 7$$

$$\Rightarrow \frac{P(2n-1, n)}{P(2n+1, n-1)} = \frac{22}{7}$$

$$\Rightarrow \frac{\frac{(2n-1)!}{(2n-1-n)!}}{\frac{(2n+1)!}{[2n+1-(n-1)]!}} = \frac{22}{7}$$

$$\Rightarrow \frac{(2n-1)! \times (n+2)!}{(n-1)! (2n+1)!} = \frac{22}{7}$$

$$\Rightarrow \frac{(2n-1)! \times (n+2)(n+2-1)(n+2-2)(n+2-3)!}{(n-1)! (2n+1)(2n+1-1)(2n+1-2)!} = \frac{22}{7}$$

$$\Rightarrow \frac{(2n-1)! \times (n+2)(n+1) \cdot n \cdot (n-1)!}{(n-1)! (2n+1) \cdot 2n \cdot (2n-1)!} = \frac{22}{7}$$

$$\Rightarrow \frac{n(n+2)(n+1)}{2n(2n+1)} = \frac{22}{7}$$

$$\Rightarrow \frac{(n+2)(n+1)}{2(2n+1)} = \frac{22}{7}$$

$$\Rightarrow \frac{n^2 + n + 2n + 2}{4n + 2} = \frac{22}{7}$$

$$\Rightarrow 7(n^2 + 3n + 2) = 22 \times (4n + 2)$$

$$\Rightarrow 7n^2 + 21n + 14 = 88n + 44$$

$$\Rightarrow 7n^2 + 21n - 88n + 14 - 44 = 0$$

$$\Rightarrow 7n^2 - 67n - 30 = 0$$

$$\Rightarrow 7n^2 - 70n + 3n - 30 = 0$$

$$\Rightarrow 7n(n-10) + 3(n-10) = 0$$

$$\Rightarrow (n-10)(7n+3) = 0$$

$$\Rightarrow n-10 = 0 \quad [\because 7n+3 \neq 0]$$

$$\Rightarrow n = 10$$

Permutations Ex 16.3 Q11

We have,

$$P(n, 5) : P(n, 3) = 2 : 1$$

$$\Rightarrow \frac{P(n, 5)}{P(n, 3)} = \frac{2}{1}$$

$$\Rightarrow \frac{\frac{n!}{(n-5)!}}{\frac{n!}{(n-3)!}} = \frac{2}{1}$$

$$\Rightarrow \frac{n! \times (n-3)!}{(n-5)! \times n!} = 2$$

$$\Rightarrow \frac{(n-3)!}{(n-5)!} = 2$$

$$\Rightarrow \frac{(n-3)(n-4)(n-5)!}{(n-5)!} = 2$$

$$\Rightarrow (n-3)(n-4) = 2$$

$$\Rightarrow n^2 - 4n - 3n + 12 = 2$$

$$\Rightarrow n^2 - 7n + 12 - 2 = 0$$

$$\Rightarrow n^2 - 7n + 10 = 0$$

$$\Rightarrow n^2 - 5n - 2n + 10 = 0$$

$$\Rightarrow n(n-5) - 2(n-5) = 0$$

$$\Rightarrow (n-5)(n-2) = 0$$

$$\Rightarrow n = 5 \quad \left[ \begin{array}{l} \because n \geq 5 \\ \therefore n \neq 2 \end{array} \right]$$

Hence,  $n = 5$

\*\*\*\*\* END \*\*\*\*\*