



Permutations Ex 16.1 Q4(iii)

We have,

$$\begin{aligned}
 & (n+1)(n+2)(n+3)\dots\dots\dots(2n) \\
 &= \frac{[1 \times 2 \times 3 \times 4 \dots\dots\dots(n-1)n] \times (n+1)(n+2)\dots(2n-1) \times 2n}{[1 \times 2 \times 3 \times 4 \dots\dots\dots(n-1)n]} \\
 &= \frac{(2n)!}{n!}
 \end{aligned}$$

Permutations Ex 16.1 Q4(iv)

We have,

$$\begin{aligned}
 & 1 \times 3 \times 5 \times 7 \times 9 \dots\dots\dots(2n-1) \\
 &= \frac{[1.3.5.7.9\dots\dots(2n-1)] \cdot [2.4.6.8\dots\dots(2n-2)(2n)]}{2.4.6.8\dots\dots(2n-2)(2n)} \\
 &= \frac{[1.3.5.7.9\dots\dots(2n-1)] \cdot [2.4.6.8\dots\dots(2n-2)(2n)]}{2^n [1.2.3.4\dots\dots((n-1)(n))]} \\
 &= \frac{1.2.3.4.5.6.7.8\dots\dots(2n-2)(2n-1)(2n)}{2^n \cdot n!} \\
 &= \frac{(2n)!}{2^n \cdot n!}
 \end{aligned}$$

$$\therefore 1.3.5.7.9\dots\dots(2n-1) = \frac{(2n)!}{2^n \cdot n!}$$

Permutations Ex 16.1 Q5

$$\begin{aligned}
 \text{(i)} \quad \text{LHS} &= (2+3)! \\
 &= 5! \\
 &= 5 \times 4 \times 3 \times 2 \times 1 \\
 &= 120
 \end{aligned}$$

$$\begin{aligned}
 \text{and, RHS} &= 2! + 3! \\
 &= 2 \times 1 + 3 \times 2 \\
 &= 2 \times 1 + 3 \times 2 \times 1 \\
 &= 2 + 6 \\
 &= 8
 \end{aligned}$$

$$\therefore 120 \neq 8$$

$$\therefore (2+3)! \neq 2! + 3!$$

So, it is false.

$$\begin{aligned}
 \text{(ii)} \quad \text{LHS} &= (2 \times 3)! \\
 &= 6! \\
 &= 6 \times 5 \times 4 \times 3 \times 2 \times 1 \\
 &= 720
 \end{aligned}$$

$$\begin{aligned}
 \text{and, RHS} &= 2! \times 3! \\
 &= 2 \times 1 \times 3 \times 2 \\
 &= 12
 \end{aligned}$$

$$\therefore 720 \neq 12$$

$$\therefore (2 \times 3)! \neq 2! \times 3!$$

Hence, it is false.

Permutations Ex 16.1 Q6

$$\begin{aligned}
 \text{LHS} &= n! + (n+1)! \\
 &= n! + (n+1)(n+1-1)! \\
 &= n! + (n+1)n! \\
 &= n!(1+n+1) \\
 &= n!(n+2) \\
 &= \text{RHS}
 \end{aligned}$$

$$\therefore n!(n+2) = n! + (n+1)!$$

Hence, proved

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