Permutations Ex 16.1 Q4(iii)

We have,

$$(n+1)(n+2)(n+3)\ldots\ldots(2n)$$

$$= \left[1 \times 2 \times 3 \times 4 \ldots\ldots\ldots(n-1)n\right] \times (n+1)(n+2)\ldots(2n-1) \times 2n$$

$$\left[1 \times 2 \times 3 \times 4 \ldots\ldots\ldots(n-1)n\right]$$

$$= \frac{(2n!)!}{n!}$$

Permutations Ex 16.1 Q4(iv)

We have,

$$1 \times \times 5 \times 7 \times 9 \ldots\ldots\ldots(2n-1)$$

$$= \frac{\left[1.3.5.7.9\ldots\ldots(2n-1)\right].\left[2.4.6.8\ldots\ldots(2n-2)(2n)\right]}{2.4.6.8\ldots\ldots(2n-2)(2n)}$$

$$= \frac{\left[1.3.5.7.9\ldots\ldots(2n-1)\right].\left[2.4.6.8\ldots\ldots(2n-2)(2n)\right]}{2^n\left[1.2.3.4\ldots\ldots((n-1)(n))\right]}$$

$$= \frac{1.2.3.4.5.6.7.8\ldots\ldots(2n-2)(2n-1)(2n)}{2^n.n!}$$

$$= \frac{(2n)!}{2^n.n!}$$

$$\therefore \quad 1.3.5.7.9\ldots\ldots(2n-1) = \frac{(2n)!}{2^n.n!}$$

Permutations Ex 16.1 Q5

(i)   LHS = $(2 + 3)!$

           $= 5!$

           $= 5 \times 4 \times 3 \times 2 \times 1$

           $= 120$

and, RHS $= 2! + 3!$

           $= 2 \times 1 + 3 \times 2$

           $= 2 \times 1 + 3 \times 2 \times 1$

           $= 2 + 6$

           $= 8$

∴ $120 \neq 8$

∴ $(2 + 3)! \neq 2! + 3!$

So, it is false.

(ii)   LHS $= (2 \times 3)!$

           $= 6!$

           $= 6 \times 5 \times 4 \times 3 \times 2 \times 1$

           $= 720$

and, RHS $= 2! \times 3!$

           $= 2 \times 1 \times 3 \times 2$

           $= 12$

∴ $720 \neq 12$

∴ $(2 \times 3)! \neq 2! \times 3!$

Hence, it is false.

Permutations Ex 16.1 Q6

           LHS $= n! + (n + 1)!$

                $= n! + (n + 1)(n + 1 - 1)!$

                $= n! + (n + 1)n!$

                $= n!(1 + n + 1)$

                $= n!(n + 2)$

                $= $ LHS

∴ $n!(n + 2) = n! + (n + 1)!$

Hence, proved

*********** END *********