CLASS − VIII   **MATHEMATICS**

ALGEBRAIC EXPRESSIONS AND IDENTITIES

1. $(a + b)^2 = a^2 + 2ab + b^2$ 2. $(a - b)^2 = a^2 - 2ab + b^2$

3. $(a + b)(a - b) = a^2 - b^2$ 4. $(x + a)(x + b) = x^2 + (a + b)x + ab$

EXERCISE − 10.5

3. (iii)   Find $(\sqrt{2}a + \sqrt{3}b)^2$ $[(a + b)^2 = a^2 + 2ab + b^2]$

Solution : $(\sqrt{2}a + \sqrt{3}b)^2 = (\sqrt{2}a)^2 + 2(\sqrt{2}a)(\sqrt{3}b) + (\sqrt{3}b)^2$

$$= 2a^2 + 2\sqrt{6}ab + 3b^2 \quad \textit{Ans.}$$

(iv) $\left(\dfrac{2x}{3y} - \dfrac{3y}{2x}\right)^2$

Solution : $\left(\dfrac{2x}{3y} - \dfrac{3y}{2x}\right)^2 = \left(\dfrac{2x}{3y}\right)^2 - 2\left(\dfrac{2x}{3y}\right)\left(\dfrac{3y}{2x}\right) + \left(\dfrac{3y}{2x}\right)^2$ $[(a - b)^2 = a^2 - 2ab + b^2]$

$$= \dfrac{4x^2}{9y^2} - 2 + \dfrac{9y^2}{4x^2} \quad \textit{Ans.}$$

* **7. (ii)** $\left(\dfrac{7}{2}a - \dfrac{5}{2}b\right)^2 - \left(\dfrac{5}{2}a - \dfrac{7}{2}b\right)^2$

Solution : $\left(\dfrac{7}{2}a - \dfrac{5}{2}b\right)^2 - \left(\dfrac{5}{2}a - \dfrac{7}{2}b\right)^2$ $[(a + b)(a - b) = a^2 - b^2]$

$$= \left(\dfrac{7}{2}a - \dfrac{5}{2}b + \dfrac{5}{2}a - \dfrac{7}{2}b\right)\left\{\left(\dfrac{7}{2}a - \dfrac{5}{2}b\right) - \left(\dfrac{5}{2}a - \dfrac{7}{2}b\right)\right\}$$

$$= \left\{\left(\dfrac{7}{2} + \dfrac{5}{2}\right)a - \left(\dfrac{7}{2} + \dfrac{5}{2}\right)b\right\}\left\{\left(\dfrac{7}{2} - \dfrac{5}{2}\right)a + \left(\dfrac{7}{2} - \dfrac{5}{2}\right)b\right\}$$

$$= \left(\dfrac{7}{2} + \dfrac{5}{2}\right)(a - b)\left(\dfrac{7}{2} - \dfrac{5}{2}\right)(a + b)$$

$$= 6(a^2 - b^2)(1)$$

$$= 6a^2 - 6b^2 \quad \textit{Ans.}$$

8. (iii) *Show that :* $(p - q)(p + q) + (q - r)(q + r) + (r - p)(r + p) = 0$

Solution : L.H.S. $(p - q)(p + q) + (q - r)(q + r) + (r - p)(r + p)$

$$= (p^2 - q^2) + (q^2 - r^2) + (r^2 - p^2)$$

$$= p^2 - q^2 + q^2 - r^2 + r^2 - p^2 = 0 \quad R.H.S. \quad \textit{Proved.}$$

14. *If* $a^2 + b^2 = 41$ *and* $ab = 4$, *find the values of* (i) $a + b$ (ii) $a - b$

Solution : *We know that* $(a + b)^2 = a^2 + b^2 + 2ab$

$$\Rightarrow \quad (a + b)^2 = 41 + 2(4) \quad [\ a^2 + b^2 = 41\ and\ ab = 4\ ]$$

$$\Rightarrow \quad (a + b)^2 = 49$$

$$\Rightarrow \quad (a + b) = \pm\ \sqrt{49}$$

$$\Rightarrow \quad (a + b) = \pm\ 7 \quad \textit{Ans.}$$

We know that $(a - b)^2 = a^2 + b^2 - 2ab$

$$\Rightarrow \quad (a - b)^2 = 41 - 2(4) \quad [\ a^2 + b^2 = 41\ and\ ab = 4\ ]$$

$$\Rightarrow \quad (a - b)^2 = 33$$

$$\Rightarrow \quad (a - b) = \pm\ \sqrt{33} \quad \textit{Ans.}$$

HOMEWORK

EXERCISE $- 10.5$

QUESTION NUMBERS : $1(i), (iv);\ \ 2(vi), (vii);\ \ 4\ (i), (ii);\ \ 7(i),\ 8(ii),\ 9\ \ and\ 12$