



### Algebraic Expressions and Identities Ex 6.6 Q1

**Answer :**

We will use the identities  $(a + b)^2 = a^2 + 2ab + b^2$  and  $(a - b)^2 = a^2 - 2ab + b^2$  to convert the squares of binomials as trinomials.

$$(i) (x + 2)^2$$

$$= x^2 + 2 \times x \times 2 + b^2$$

$$= x^2 + 4x + b^2$$

$$(ii) (8a + 3b)^2$$

$$= (8a)^2 + 2(8a)(3b) + (6b)^2$$

$$= 64a^2 + 48ab + 36b^2$$

$$(iii) (2m + 1)^2$$

$$= (2m)^2 + 2(2m)(1) + 1^2$$

$$= 4m^2 + 4m + 1$$

$$(iv) \left(9a + \frac{1}{6}\right)^2$$

$$= (9a)^2 + 2(9a)\left(\frac{1}{6}\right) + \left(\frac{1}{6}\right)^2$$

$$= 81a^2 + 3a + \frac{1}{36}$$

$$\begin{aligned}
 & \left( \text{v} \right) \left( x + \frac{x^2}{2} \right)^2 \\
 &= x^2 + 2x \left( \frac{x^2}{2} \right) + \left( \frac{x^2}{2} \right)^2 \\
 &= x^2 + x^3 + \frac{x^4}{4}
 \end{aligned}$$

$$\begin{aligned}
 & \left( \text{vi} \right) \left( \frac{x}{4} - \frac{y}{3} \right)^2 \\
 &= \left( \frac{x}{4} \right)^2 - 2 \left( \frac{x}{4} \right) \left( \frac{y}{3} \right) + \left( \frac{y}{3} \right)^2 \\
 &= \frac{x^2}{16} - \frac{1}{6} xy + \frac{y^2}{9}
 \end{aligned}$$

$$\begin{aligned}
 & \left( \text{vii} \right) \left( 3x - \frac{1}{3x} \right)^2 \\
 &= (3x)^2 - 2(3x) \left( \frac{1}{3x} \right) + \left( \frac{1}{3x} \right)^2 \\
 &= 9x^2 - 2 + \frac{1}{9x^2}
 \end{aligned}$$

$$\begin{aligned}
 & \left( \text{viii} \right) \left( \frac{x}{y} - \frac{y}{x} \right)^2 \\
 &= \left( \frac{x}{y} \right)^2 - 2 \left( \frac{x}{y} \right) \left( \frac{y}{x} \right) + \left( \frac{y}{x} \right)^2 \\
 &= \frac{x^2}{y^2} - 2 + \frac{y^2}{x^2}
 \end{aligned}$$

$$\begin{aligned}
 & \left( \text{ix} \right) \left( \frac{3a}{2} - \frac{5b}{4} \right)^2 \\
 &= \left( \frac{3a}{2} \right)^2 - 2 \left( \frac{3a}{2} \right) \left( \frac{5b}{4} \right) + \left( \frac{5b}{4} \right)^2 \\
 &= \frac{9a^2}{4} - \frac{15ab}{4} + \frac{25b^2}{16}
 \end{aligned}$$

$$\begin{aligned}
 & \left( \text{x} \right) \left( a^2b - bc^2 \right)^2 \\
 &= \left( a^2b \right)^2 - 2 \left( a^2b \right) \left( bc^2 \right) + \left( bc^2 \right)^2 \\
 &= a^4b^2 - 2a^2b^2c^2 + b^2c^4
 \end{aligned}$$

$$\begin{aligned}
 & \left( \text{xi} \right) \left( \frac{2a}{3b} + \frac{2b}{3a} \right)^2 \\
 &= \left( \frac{2a}{3b} \right)^2 + 2 \left( \frac{2a}{3b} \right) \left( \frac{2b}{3a} \right) + \left( \frac{2b}{3a} \right)^2 \\
 &= \frac{4a^2}{9b^2} + \frac{8}{9} + \frac{4b^2}{9a^2}
 \end{aligned}$$

$$\begin{aligned}
 & \left( \text{xii} \right) \left( x^2 - ay \right)^2 \\
 &= \left( x^2 \right)^2 - 2x^2(ay) + (ay)^2 \\
 &= x^4 - 2x^2ay + a^2y^2
 \end{aligned}$$

**Answer :**

(i) We will use the identity  $(a + b)^2 = a^2 + 2ab + b^2$  in the given expression to find the product.

$$(2x + y)(2x + y)$$

$$= (2x + y)^2$$

$$= (2x)^2 + 2(2x)(y) + y^2$$

$$= 4x^2 + 4xy + y^2$$

(ii) We will use the identity  $(a + b)(a - b) = a^2 - b^2$  in the given expression to find the product.

$$(a + 2b)(a - 2b)$$

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

$$= a^2 - 4b^2$$

(iii) We will use the identity  $(a + b)(a - b) = a^2 - b^2$  in the given expression to find the product.

$$(a^2 + bc)(a^2 - bc)$$

$$= (a^2)^2 - (bc)^2$$

$$= a^4 - b^2c^2$$

(iv) We will use the identity  $(a + b)(a - b) = a^2 - b^2$  in the given expression to find the product.

$$\left(\frac{4x}{5} - \frac{3y}{4}\right)\left(\frac{4x}{5} + \frac{3y}{4}\right)$$

$$= \left(\frac{4x}{5}\right)^2 - \left(\frac{3y}{4}\right)^2$$

$$= \frac{16x^2}{25} - \frac{9y^2}{16}$$

(v) We will use the identity  $(a + b)(a - b) = a^2 - b^2$  in the given expression to find the product.

$$\left(2x + \frac{3}{y}\right)\left(2x - \frac{3}{y}\right)$$

$$= (2x)^2 - \left(\frac{3}{y}\right)^2$$

$$= 4x^2 - \frac{9}{y^2}$$

(vi) We will use the identity  $(a + b)(a - b) = a^2 - b^2$  in the given expression to find the product.

$$(2a^3 + b^3)(2a^3 - b^3)$$

$$= (2a^3)^2 - (b^3)^2$$

$$= 4a^6 - b^6$$

(vii) We will use the identity  $(a + b)(a - b) = a^2 - b^2$  in the given expression to find the product.

$$\left(x^4 + \frac{2}{x^2}\right)\left(x^4 - \frac{2}{x^2}\right)$$

$$= (x^4)^2 - \left(\frac{2}{x^2}\right)^2$$

$$= x^8 - \frac{4}{x^4}$$

(viii) We will use the identity  $(a + b)(a - b) = a^2 - b^2$  in the given expression to find the product.

$$\left(x^3 + \frac{1}{x^3}\right)\left(x^3 - \frac{1}{x^3}\right)$$

$$= (x^3)^2 - \left(\frac{1}{x^3}\right)^2$$

$$= x^6 - \frac{1}{x^6}$$

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