

NCERT Solutions for Class 8 Maths Chapter 9 Algebraic Expressions and Identities Ex 9.4

Ex 9.4 Class 8 Maths Question 1.

Multiply the binomials:

(i) $(2x + 5)$ and $(4x - 3)$

(ii) $(y - 8)$ and $(3y - 4)$

(iii) $(2.5l - 0.5m)$ and $(2.5l + 0.5m)$

(iv) $(a + 3b)$ and $(x + 5)$

(v) $(2pq + 3q^2)$ and $(3pq - 2q^2)$

(vi) $(\frac{3}{4}a^2 + 3b^2)$ and $4(a^2 - \frac{2}{3}b^2)$

Solution:

(i) $(2x + 5) \times (4x - 3)$

$$= 2x \times (4x - 3) + 5 \times (4x - 3)$$

$$= (2x \times 4x) - (3 \times 2x) + (5 \times 4x) - (5 \times 3)$$

$$= 8x^2 - 6x + 20x - 15$$

$$= 8x^2 + 14x - 15$$

(ii) $(y - 8) \times (3y - 4)$

$$= y \times (3y - 4) - 8 \times (3y - 4)$$

$$= (y \times 3y) - (y \times 4) - (8 \times 3y) + (-8 \times -4)$$

$$= 3y^2 - 4y - 24y + 32$$

$$= 3y^2 - 28y + 32$$

(iii) $(2.5l - 0.5m) \times (2.5l + 0.5m)$

$$= (2.5l \times 2.5l) + (2.5l \times 0.5m) - (0.5m \times 2.5l) - (0.5m \times 0.5m)$$

$$= 6.25l^2 + 1.25ml - 1.25ml - 0.25m^2$$

$$= 6.25l^2 + 0 - 0.25m^2$$

$$= 6.25l^2 - 0.25m^2$$

(iv) $(a + 3b) \times (x + 5)$

$$= a \times (x + 5) + 3b \times (x + 5)$$

$$= (a \times x) + (a \times 5) + (3b \times x) + (3b \times 5)$$

$$= ax + 5a + 3bx + 15b$$

$$\begin{aligned}
& (v) (2pq + 3q^2) \times (3pq - 2q^2) \\
&= 2pq \times (3pq - 2q^2) + 3q^2 (3pq - 2q^2) \\
&= (2pq \times 3pq) - (2pq \times 2q^2) + (3q^2 \times 3pq) - (3q^2 \times 2q^2) \\
&= 6p^2q^2 - 4pq^3 + 9pq^3 - 6q^4 \\
&= 6p^2q^2 + 5pq^3 - 6q^4
\end{aligned}$$

$$\begin{aligned}
& (vi) \left(\frac{3}{4}a^2 + 3b^2 \right) \times 4 \left(a^2 - \frac{2}{3}b^2 \right) \\
&= \left(\frac{3}{4}a^2 + 3b^2 \right) \times \left(4a^2 - \frac{8}{3}b^2 \right) \\
&= \frac{3}{4}a^2 \times \left(4a^2 - \frac{8}{3}b^2 \right) \\
&\quad + 3b^2 \times \left(4a^2 - \frac{8}{3}b^2 \right) \\
&= \left(\frac{3}{4}a^2 \times 4a^2 \right) - \left(\frac{3}{4}a^2 \times \frac{8}{3}b^2 \right) \\
&\quad + (3b^2 \times 4a^2) - \left(3b^2 \times \frac{8}{3}b^2 \right) \\
&= 3a^4 - 2a^2b^2 + 12a^2b^2 - 8b^4 \\
&= 3a^4 + 10a^2b^2 - 8b^4
\end{aligned}$$

Ex 9.4 Class 8 Maths Question 2.

Find the product:

(i) $(5 - 2x)(3 + x)$

(ii) $(x + 7y)(7x - y)$

(iii) $(a^2 + b)(a + b^2)$

(iv) $(p^2 - q^2)(2p + q)$

Solution:

(i) $(5 - 2x)(3 + x)$

$$= 5(3 + x) - 2x(3 + x)$$

$$= (5 \times 3) + (5 \times x) - (2x \times 3) - (2x \times x)$$

$$= 15 + 5x - 6x - 2x^2$$

(ii) $(x + 7y)(7x - y)$

$$= x(7x - y) + 7y(7x - y)$$

$$= (x \times 7x) - (x \times y) + (7y \times 7x) - (7y \times y)$$

$$= 7x^2 - xy + 49xy - 7y^2$$

$$= 7x^2 + 48xy - 7y^2$$

$$\begin{aligned}
& \text{(iii) } (a^2 + b)(a + b^2) \\
& = a^2(a + b^2) + b(a + b^2) \\
& = (a^2 \times a) + (a^2 \times b^2) + (b \times a) + (b \times b^2) \\
& = a^3 + a^2b^2 + ab + b^3
\end{aligned}$$

$$\begin{aligned}
& \text{(iv) } (p^2 - q^2)(2p + q) \\
& = p^2(2p + q) - q^2(2p + q) \\
& = (p^2 \times 2p) + (p^2 \times q) - (q^2 \times 2p) - (q^2 \times q) \\
& = 2p^3 + p^2q - 2pq^2 - q^3
\end{aligned}$$

Ex 9.4 Class 8 Maths Question 3.

Simplify:

$$\text{(i) } (x^2 - 5)(x + 5) + 25$$

$$\text{(ii) } (a^2 + 5)(b^3 + 3) + 5$$

$$\text{(iii) } (t + s^2)(t^2 - s)$$

$$\text{(iv) } (a + b)(c - d) + (a - b)(c + d) + 2(ac + bd)$$

$$\text{(v) } (x + y)(2x + y) + (x + 2y)(x - y)$$

$$\text{(vi) } (x + y)(x^2 - xy + y^2)$$

$$\text{(vii) } (1.5x - 4y)(1.5x + 4y + 3) - 4.5x + 12y$$

$$\text{(viii) } (a + b + c)(a + b - c)$$

Solution:

$$\begin{aligned}
& \text{(i) } (x^2 - 5)(x + 5) + 25 \\
& = x^2(x + 5) + 5(x + 5) + 25 \\
& = x^3 + 5x^2 - 5x - 25 + 25 \\
& = x^3 + 5x^2 - 5x + 0 \\
& = x^3 + 5x^2 - 5x
\end{aligned}$$

$$\begin{aligned}
& \text{(ii) } (a^2 + 5)(b^3 + 3) + 5 \\
& = a^2(b^3 + 3) + 5(b^3 + 3) + 5 \\
& = a^2b^3 + 3a^2 + 5b^3 + 15 + 5 \\
& = a^2b^3 + 3a^2 + 5b^3 + 20
\end{aligned}$$

$$\begin{aligned}
& \text{(iii) } (t + s^2)(t^2 - s) \\
& = t(t^2 - s) + s^2(t^2 - s) \\
& = t^3 - st + s^2t^2 - s^3 \\
& = t^3 + s^2t^2 - st - s^3
\end{aligned}$$

$$\begin{aligned}
& \text{(iv) } (a + b)(c - d) + (a - b)(c + d) + 2(ac + bd) \\
& = a(c - d) + b(c - d) + a(c + d) - b(c + d) + 2ac + 2bd \\
& = ac - ad + bc - bd + ac + ad - bc - bd + 2ac + 2bd \\
& = ac + ac + 2ac + bc - bc - ad + ad - bd - bd + 2bd \\
& = 4ac + 0 + 0 + 0 \\
& = 4ac
\end{aligned}$$

$$\begin{aligned}
& \text{(v) } (x + y)(2x + y) + (x + 2y)(x - y) \\
& = x(2x + y) + y(2x + y) + x(x - y) + 2y(x - y) \\
& = 2x^2 + xy + 2xy + y^2 + x^2 - xy + 2xy - 2y^2 \\
& = 2x^2 + x^2 + xy + 2xy - xy + 2xy + y^2 - 2y^2 \\
& = 3x^2 + 4xy - y^2
\end{aligned}$$

$$\begin{aligned}
& \text{(vi) } (x + y)(x^2 - xy + y^2) \\
& = x(x^2 - xy + y^2) + y(x^2 - xy + y^2) \\
& = x^3 - x^2y + x^2y + xy^2 - xy^2 + y^3 \\
& = x^3 - 0 + 0 + y^3 \\
& = x^3 + y^3
\end{aligned}$$

$$\begin{aligned}
& \text{(vii) } (1.5x - 4y)(1.5x + 4y + 3) - 4.5x + 12y \\
& = 1.5x(1.5x + 4y + 3) - 4y(1.5x + 4y + 3) - 4.5x + 12y \\
& = 2.25x^2 + 6xy + 4.5x - 6xy - 16y^2 - 12y - 4.5x + 12y \\
& = 2.25x^2 + 6xy - 6xy + 4.5x - 4.5x + 12y - 12y - 16y^2 \\
& = 2.25x^2 + 0 + 0 + 0 - 16y^2 \\
& = 2.25x^2 - 16y^2
\end{aligned}$$

$$\begin{aligned}
& \text{(viii) } (a + b + c)(a + b - c) \\
& = a(a + b - c) + b(a + b - c) + c(a + b - c) \\
& = a^2 + ab - ac + ab + b^2 - bc + ac + bc - c^2 \\
& = a^2 + ab + ab - bc + bc - ac + ac + b^2 - c^2 \\
& = a^2 + 2ab + b^2 - c^2 + 0 + 0 \\
& = a^2 + 2ab + b^2 - c^2
\end{aligned}$$