NCERT Solutions for Class 8 Maths Chapter 10 Algebraic Expressions and Identities Ex 8.4

Ex 8.4 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) $(\frac{3}{4}a + 3b)$ and $4(a - b)^2$

Solution:

(i) (2x + 5) × (4x − 3)

= 2x × (4x − 3) + 5 × (4x − 3)

= (2x × 4x) − (3 × 2x) + (5 × 4x) − (5 × 3)

= $8x^2$ − 6x + 20x − 15

= $8x^2$ + 14x − 15

(ii) (y − 8) × (3y − 4)

= y × (3y − 4) − 8 × (3y − 4)

= (y × 3y) − (y × 4) − (8 × 3y) + (-8 × -4)

= $3y^2$ − 4y − 24y + 32

= $3y^2$ − 28y + 32

(iii) (2.5l − 0.5m) × (2.5l + 0.5m)

= (2.5l × 2.5l) + (2.5l × 0.5m) − (0.5m × 2.5l) − (0.5m × 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) × (x + 5)

= a × (x + 5) + 36 × (x + 5)

= (a × x) + (a × 5) + (36 × x) + (36 × 5)

= ax + 5a + 3bx + 15b

(v) $(2pq + 3q^2) \times (3pq - 2q^2)$

$= 2pq \times (3pq - 2q^2) + 3q^2 (3pq - 2q^2)$

$= (2pq \times 3pq) - (2pq \times 2q^2) + (3q \times 3pq) - (3q \times 2q^2)$

$= 6p^2q^2 - 4pq^3 + 9pq^3 - 6q^4$

$= 6p^2q^2 + 5pq^3 - 6q^4$

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

$= \left(\frac{3}{4}a^2 + 3b^2\right) \times \left(4a^2 - \frac{8}{3}b^2\right)$

$= \frac{3}{4}a^2 \times \left(4a^2 - \frac{8}{3}b^2\right) + 3b^2 \times \left(4a^2 - \frac{8}{3}b^2\right)$

$= \left(\frac{3}{4}a^2 \times 4a^2\right) - \left(\frac{3}{4}a^2 \times \frac{8}{3}b^2\right) + (3b^2 \times 4a^2) - \left(3b^2 \times \frac{8}{3}b^2\right)$

$= 3a^4 - 2a^2b^2 + 12a^2b^2 - 8b^4$

$= 3a^4 + 10a^2b^2 - 8b^4$

Ex 8.4 Class 8 Maths Question 2.

Find the product:

(i) (5 − 2x) (3 + x)

(ii) (x + 7y) (7x − y)

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

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

Solution:

(i) (5 − 2x) (3 + x)

= 5(3 + x) − 2x(3 + x)

= (5 × 3) + (5 × x) − (2x × 3) − (2x × x)

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

(ii) (x + 7y) (7x − y)

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

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

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

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

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

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

$= (a \times a) + (a \times b^2) + (b \times a) + (b \times b^2)$

$= a^3 + a^2b + ab + b^3$

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

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

$= (p \times 2p) + (p \times q) - (q^2 \times 2p) - (q^2 \times q)$

$= 2p^2 + pq - 2pq^2 - q^3$

Ex 8.4 Class 8 Maths Question 3.

Simplify:

(i) $(x - 5)^2 (x + 5) + 25$

(ii) $(a + 5)^2(b + 3) + 5$

(iii) $(t + s^2)(t - s)$

(iv) $(a + b)(c - d) + (a - b)(c + d) + 2(ac + bd)$

(v) $(x + y)(2x + y) + (x + 2y)(x - y)$

(vi) $(x + y)^2(x^2 - xy + y^2)$

(vii) $(1.5x - 4y)(1.5x + 4y + 3) - 4.5x + 12y$

(viii) $(a + b + c)(a + b - c)$

Solution:

(i) $(x - 5)^2 (x + 5) + 25$

$= x^2 (x + 5) + 5(x + 5) + 25$

$= x^3 + 5x^2 - 5x - 25 + 25$

$= x^3 + 5x^2 - 5x + 0$

$= x^3 + 5x^2 - 5x$

(ii) $(a^2 + 5)(b^3 + 3) + 5$

$= a^2(b^3 + 3) + 5(b^3 + 3) + 5$

$= a^2b^3 + 3a^2 + 5b^3 + 15 + 5$

$= a^2b^3 + 3a^2 + 5b^3 + 20$

(iii) $(t^2 + s^2)(t - s)$

$= t(t^2 - s^2) + s^2(t - s)$

$= t^3 - st^2 + s^2t - s^3$

$= t^3 + s^2t - st^2 - s^3$

(iv) $(a + b)(c - d) + (a - b)(c + d) + 2(ac + bd)$

$= a(c - d) + b(c - d) + a(c + d) - b(c + d) + 2ac + 2bd$

$= ac - ad + bc - bd + ac + ad - bc - bd + 2ac + 2bd$

$= ac + ac + 2ac + bc - bc - ad + ad - bd - bd + 2bd$

$= 4ac + 0 + 0 + 0$

$= 4ac$

(v) $(x + y)(2x + y) + (x + 2y)(x - y)$

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

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

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

$= 3x^2 + 4xy - y^2$

(vi) $(x^2 + y^2)(x^2 - xy + y^2)$

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

$= x^4 - x^3y + x^2y^2 + x^2y^2 - xy^3 + y^4$

$= x^4 + 0 + 0 + y^4$

$= x^4 + y^4$

= x + y

(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

$$= 2.25x^2 + 6xy + 4.5x - 6xy - 16y^2 - 12y - 4.5x + 12y$$

$$= 2.25x^2 + 6xy - 6xy + 4.5x - 4.5x + 12y - 12y - 16y^2$$

$$= 2.25x^2 + 0 + 0 + 0 - 16y^2$$

$$= 2.25x^2 - 16y^2$$

(viii) (a + b + c) (a + b − c)

= a(a + b − c) + b(a + b − c) + c(a + b − c)

$$= a^2 + ab - ac + ab + b^2 - bc + ac + bc - c^2$$

$$= a^2 + ab + ab - bc + bc - ac + ac + b^2 - c^2$$

$$= a^2 + 2ab + b^2 - c^2 + 0 + 0$$

$$= a^2 + 2ab + b^2 - c^2$$