

TEXT BOOK EXERCISE 8.4

Q. 1. Find the product of

- (i) $(x + 5)$ and $(x + 4)$
- (ii) $(2x + 3)$ and $(x - 7)$
- (iii) $(x - 8)$ and $(x + 3)$
- (iv) $(2x - 3)$ and $(x - 4)$
- (v) $(2x + 3y)$ and $(x + 2y)$
- (vi) $(x + y)$ and $(x - 3y)$
- (vii) $(p - q)$ and $(p + 3q)$
- (viii) $(2p - 3q)$ and $(4p - 3q)$
- (ix) $(a^2 - b)$ and $(a + b^2)$
- (x) $\left(\frac{7}{2}x + y^2\right)$ and $\left(x^2 - \frac{2}{7}y\right)$
- (xi) $(0.2x + 0.5y)$ and $(3xy - 5y^2)$
- (xii) $(p^2 - q)$ and $(p^2 + q)$

Solution.

- (i) $(x + 5)(x + 4) = x(x + 4) + 5(x + 4)$
 $= x^2 + 4x + 5x + 20$
 $= x^2 + 9x + 20$ **Ans.**
- (ii) $(2x + 3)(x - 7) = 2x(x - 7) + 3(x - 7)$
 $= 2x^2 - 14x + 3x - 21$
 $= 2x^2 - 11x - 21$ **Ans.**
- (iii) $(x - 8)(x + 3) = x(x + 3) - 8(x + 3)$
 $= x^2 + 3x - 8x - 24$
 $= x^2 - 5x - 24$ **Ans.**
- (iv) $(2x - 3)(x - 4) = 2x(x - 4) - 3(x - 4)$
 $= 2x^2 - 8x - 3x + 12$
 $= 2x^2 - 11x + 12$ **Ans.**
- (v) $(2x + 3y)(x + 2y)$
 $= 2x(x + 2y) + 3y(x + 2y)$
 $= 2x^2 + 4xy + 3xy + 6y^2$
 $= 2x^2 + 7xy + 6y^2$ **Ans.**
- (vi) $(x + y)(x - 3y) = x(x - 3y) + y(x - 3y)$
 $= x^2 - 3xy + xy - 3y^2$
 $= x^2 - 2xy - 3y^2$ **Ans.**
- (vii) $(p - q)(p + 3q)$
 $= p(p + 3q) - q(p + 3q)$
 $= p^2 + 3pq - pq - 3q^2$
 $= p^2 + 2pq - 3q^2$ **Ans.**

$$\begin{aligned} \text{(viii)} \quad (2p - 3q)(4p - 3q) &= 2p(4p - 3q) - 3q(4p - 3q) \\ &= 8p^2 - 6pq - 12pq + 9q^2 \\ &= 8p^2 - 18pq + 9q^2 \text{ **Ans.**} \end{aligned}$$

$$\begin{aligned} \text{(ix)} \quad (a^2 - b)(a + b^2) &= a^2(a + b^2) - b(a + b^2) \\ &= a^3 + a^2b^2 - ab - b^3 \text{ **Ans.**} \end{aligned}$$

$$\begin{aligned} \text{(x)} \quad \left(\frac{7}{2}x + y^2\right)\left(x^2 - \frac{2}{7}y\right) &= \frac{7}{2}x\left(x^2 - \frac{2}{7}y\right) + y^2\left(x^2 - \frac{2}{7}y\right) \\ &= \frac{7}{2}x^3 - xy + x^2y^2 - \frac{2}{7}y^3 \text{ **Ans.**} \end{aligned}$$

$$\begin{aligned} \text{(xi)} \quad (0.2x + 0.5y)(3xy - 5y^2) &= 0.2x(3xy - 5y^2) + 0.5y(3xy - 5y^2) \\ &= 0.6x^2y - 1.0xy^2 + 1.5xy^2 - 2.5y^3 \\ &= 0.6x^2y - xy^2 + 1.5xy^2 - 2.5y^3 \\ &= 0.6x^2y + 0.5xy^2 - 2.5y^3 \text{ **Ans.**} \end{aligned}$$

$$\begin{aligned} \text{(xii)} \quad (p^2 - q)(p^2 + q) &= p^2(p^2 + q) - q(p^2 + q) \\ &= p^4 + p^2q - p^2q - q^2 \\ &= p^4 - q^2 \text{ **Ans.**} \end{aligned}$$

Q. 2. Simplify :

- (i) $(y - 3)(y + 3) + 28$
- (ii) $(a^2 - 3)(b^2 + 5) - 8$
- (iii) $(y^2 - 7)(x + y) + 13y$
- (iv) $(3x - y)(x + 5y) - 14xy$
- (v) $(a + b)(a - b) + (b + c)(b - c) + (c + a)(c - a)$
- (vi) $\left(\frac{3}{2}x + y\right)\left(x + \frac{1}{2}y\right) - \left(\frac{1}{2}x + y\right)\left(x + \frac{3}{2}y\right)$
- (vii) $(p - q)(p + q) + (p + q + r)(p + q - r)$
- (viii) $(x + y)(x - y + xy) - 3xy(x + y)$
- (ix) $(l + m)(l - m + n) - (l^2 + m^2)$
- (x) $(2x^2 - 5x + 7)(x - 6) + 42$

Solution.

$$\begin{aligned} \text{(i)} \quad (y - 3)(y + 3) + 28 &= y(y + 3) - 3(y + 3) + 28 \\ &= y^2 + 3y - 3y - 9 + 28 \\ &= y^2 + 19 \text{ **Ans.**} \end{aligned}$$

$$\begin{aligned}
 \text{(ii)} \quad & (a^2 - 3)(b^2 + 5) - 8 \\
 &= a^2(b^2 + 5) - 3(b^2 + 5) - 8 \\
 &= a^2b^2 + 5a^2 - 3b^2 - 15 - 8 \\
 &= a^2b^2 + 5a^2 - 3b^2 - 23 \text{ Ans.}
 \end{aligned}$$

$$\begin{aligned}
 \text{(iii)} \quad & (y^2 - 7)(x + y) + 13y \\
 &= y^2(x + y) - 7(x + y) + 13y \\
 &= y^2x + y^3 - 7x - 7y + 13y \\
 &= y^2x + y^3 - 7x + 6y \text{ Ans.}
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad & (3x - y)(x + 5y) - 14xy \\
 &= 3x(x + 5y) - y(x + 5y) - 14xy \\
 &= 3x^2 + 15xy - xy - 5y^2 - 14xy \\
 &= 3x^2 + 14xy - 5y^2 - 14xy \\
 &= 3x^2 - 5y^2 \text{ Ans.}
 \end{aligned}$$

$$\begin{aligned}
 \text{(v)} \quad & (a + b)(a - b) + (b + c) + (b - c) + (c + a) \\
 & \qquad \qquad \qquad (c - a) \\
 &= a(a - b) + b(a - b) + b(b - c) \\
 & \quad + c(b - c) + c(c - a) + a(c - a) \\
 &= a^2 - ab + ab - b^2 + b^2 - bc + bc - c^2 \\
 & \quad + a^2 - ca + ca - a^2 = 0 \text{ Ans.}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vi)} \quad & \left(\frac{3}{2}x + y\right)\left(x + \frac{1}{2}y\right) - \left(\frac{1}{2}x + y\right)\left(x + \frac{3}{2}y\right) \\
 &= \frac{3}{2}x\left(x + \frac{1}{2}y\right) + y\left(x + \frac{1}{2}y\right) - \left[\frac{1}{2}x\left(x + \frac{3}{2}y\right) \right. \\
 & \qquad \qquad \qquad \left. + y\left(x + \frac{3}{2}y\right)\right]
 \end{aligned}$$

$$\begin{aligned}
 &= \frac{3}{2}x^2 + \frac{3}{4}xy + xy + \frac{1}{2}y^2 \\
 & \quad - \left[\frac{1}{2}x^2 + \frac{3}{4}xy + xy + \frac{3}{2}y^2\right] \\
 &= \frac{3}{2}x^2 + \frac{3}{4}xy + xy + \frac{1}{2}y^2 - \frac{1}{2}x^2 - \frac{3}{4}xy \\
 & \quad - xy - \frac{3}{2}y^2 = x^2 - y^2 \text{ Ans.}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vii)} \quad & (p - q)(p + q) + (p + q + r)(p + q - r) \\
 &= p(p + q) - q(p + q) + p(p + q - r) \\
 & \quad + q(p + q - r) + r(p + q - r) \\
 &= p^2 + pq - pq - q^2 + p^2 + pq - pr \\
 & \quad + pq + q^2 - qr + pr + qr - r^2 \\
 &= 2p^2 + 2pq - r^2 \text{ Ans.}
 \end{aligned}$$

$$\begin{aligned}
 \text{(viii)} \quad & (x + y)(x - y + xy) - 3xy(x + y) \\
 &= x(x - y + xy) + y(x - y + xy) \\
 & \qquad \qquad \qquad - 3x^2y - 3xy^2 \\
 &= x^2 - xy + x^2y + xy - y^2 + xy^2 \\
 & \qquad \qquad \qquad - 3x^2y - 3xy^2 \\
 &= x^2 - y^2 - 2x^2y - 2xy^2 \text{ Ans.}
 \end{aligned}$$

$$\begin{aligned}
 \text{(ix)} \quad & (l + m)(l - m - n) - (l^2 + m^2) \\
 &= l(l - m + n) + m(l - m + n) - (l^2 + m^2) \\
 &= l^2 - ml + ln + ml - m^2 + mn - l^2 - m^2 \\
 &= ln + mn - 2m^2 \text{ Ans.}
 \end{aligned}$$

$$\begin{aligned}
 \text{(x)} \quad & (2x^2 - 5x + 7)(x - 6) + 42 \\
 &= 2x^2(x - 6) - 5x(x - 6) + 7(x - 6) + 42 \\
 &= 2x^3 - 12x^2 - 5x^2 + 30x + 7x - 42 + 42 = \\
 &= 2x^3 - 17x^2 + 37x \text{ Ans.}
 \end{aligned}$$