

Question 1.

Solution:

$$\begin{aligned} &9x^2 + 12xy \\ &= 3x (3x + 4y) \end{aligned}$$

Question 2.

Solution:

$$\begin{aligned} &18x^2y - 24xyz \\ &= 6xy (3x - 4z) \end{aligned}$$

Question 3.

Solution:

$$\begin{aligned} &27a^3b^3 - 45a^4b^2 \\ &= 9a^3b^2 (3b - 5a) \end{aligned}$$

Question 4.

Solution:

$$\begin{aligned} &2a (x + y) - 3b(x + y) \\ &= (x + y) (2a - 3b) \end{aligned}$$

Question 5.

Solution:

$$\begin{aligned} &2x (p^2 + q^2) + 4y (p^2 + q^2) \\ &= 2(p^2 + q^2) (x + 2y) \text{ Ans} \end{aligned}$$

Question 6.

Solution:

$$x (a - 5) + y (5 - a)$$

$$\begin{aligned} &= x(a - 5) - y(a - 5) \\ &= (a - 5)(x - y) \end{aligned}$$

Question 7.

Solution:

$$\begin{aligned} &4(a + b) - 6(a + b)^2 \\ &= 2(a + b) \{2 - 3(a + b)\} \\ &= 2(a + b)(2 - 3a - 3b) \end{aligned}$$

Question 8.

Solution:

$$\begin{aligned} &8(3a - 2b)^2 - 10(3a - 2b) \\ &= 2(3a - 2b) \{4(3a - 2b) - 5\} \\ &= 2(3a - 2b)(12a - 8b - 5) \end{aligned}$$

Question 9.

Solution:

$$\begin{aligned} &x(x + y)^3 - 3x^2y(x + y) \\ &= x(x + y) \{(x + y)^2 - 3xy\} \\ &= x(x + y) [x^2 + y^2 + 2xy - 3xy] \\ &= x(x + y)(x^2 + y^2 - xy) \end{aligned}$$

Question 10.

Solution:

$$\begin{aligned} &x^3 + 2x^2 + 5x + 10 \\ &= x^2(x + 2) + 5(x + 2) \\ &= (x + 2)(x^2 + 5) \end{aligned}$$

Question 11.

Solution:

$$\begin{aligned} & x^2 + xy - 2xz - 2yz \\ &= x(x + y) - 2z(x + y) \\ &= (x + y)(x - 2z) \end{aligned}$$

Question 12.

Solution:

$$\begin{aligned} & a^3b - a^2b + 5ab - 5b \\ &= b(a^3 - a^2 + 5a - 5) \\ &= b\{(a^2(a - 1) + 5(a - 1))\} \\ &= b(a - 1)(a^2 + 5) \end{aligned}$$

Question 13.

Solution:

$$\begin{aligned} & 8 - 4a - 2a^3 + a^4 \\ &= 4(2 - a) - a^3(2 - a) \\ &= (2 - a)(4 - a^3) \end{aligned}$$

Question 14.

Solution:

$$\begin{aligned} & x^3 - 2x^2y + 3xy^2 - 6y^3 \\ &= x^2(x - 2y) + 3y^2(x - 2y) \\ &= (x - 2y)(x^2 + 3y^2) \text{ Ans} \end{aligned}$$

Question 15.

Solution:

$$\begin{aligned} & px - 5q + pq - 5x \\ &= px - 5x + pq - 5q \\ &= x(p - 5) + q(p - 5) \\ &= (p - 5)(x + q) \end{aligned}$$

Question 16.

Solution:

$$\begin{aligned} & x^2 + y - xy - x \\ &= x^2 - x - xy + y \\ &= x(x - 1) - y(x - 1) \\ &= (x - 1)(x - y) \end{aligned}$$

Question 17.

Solution:

$$\begin{aligned} & (3a - 1)^2 - 6a + 2 \\ &= (3a - 1)^2 - 2(3a - 1) \\ &= (3a - 1)(3a - 1 - 2) \\ &= (3a - 1)(3a - 3) \\ &= 3(3a - 1)(a - 1) \end{aligned}$$

Question 18.

Solution:

$$\begin{aligned} & (2x - 3)^2 - 8x + 12 \\ &= (2x - 3)^2 - 4(2x - 3) \\ &= (2x - 3)(2x - 3 - 4) \\ &= (2x - 3)(2x - 7) \end{aligned}$$

Question 19.

Solution:

$$\begin{aligned} & a^3 + a - 3a^2 - 3 \\ &= a^3 - 3a^2 + a - 3 \\ &= a^2(a - 3) + 1(a - 3) \\ &= (a - 3)(a^2 + 1) \end{aligned}$$

Question 20.

Solution:

$$\begin{aligned} & 3ax - 6ay - 8by + 4bx \\ &= 3ax - 6ay + 4bx - 8by \\ &= 3a(x - 2y) + 4b(x - 2y) \\ &= (x - 2y)(3a + 4b) \text{ Ans} \end{aligned}$$

Question 21.

Solution:

$$\begin{aligned} & abx^2 + a^2x + b^2x + ab \\ &= ax(bx + a) + b(bx + a) \\ &= (bx + a)(ax + b) \end{aligned}$$

Question 22.

Solution:

$$\begin{aligned} & x^3 - x^2 + ax + x - a - 1 \\ &= x^3 - x^2 + ax - a + x - 1 \\ &= x^2(x - 1) + a(x - 1) + 1(x - 1) \\ &= (x - 1)(x^2 + a + 1) \end{aligned}$$

Question 23.

Solution:

$$\begin{aligned} & 2x + 4y - 8xy - 1 \\ &= 2x - 8xy - 1 + 4y \\ &= 2x(1 - 4y) - 1(1 - 4y) \\ &= (1 - 4y)(2x - 1) \end{aligned}$$

Question 24.

Solution:

$$ab(x^2 + y^2) - xy(a^2 + b^2)$$

$$\begin{aligned} &= abx^2 + aby^2 - a^2xy - b^2xy \\ &= abx^2 - a^2xy - b^2xy + aby^2 \\ &= ax(bx - ay) - by(bx - ay) \\ &= (bx - ay)(ax - by) \end{aligned}$$

Question 25.

Solution:

$$\begin{aligned} &a^2 + ab(b + 1) + b^3 \\ &= a^2 + ab^2 + ab + b^3 \\ &= a(a + b^2) + b(a + b^2) \\ &= (a + b^2)(a + b) \text{ Ans} \end{aligned}$$

Question 26.

Solution:

$$\begin{aligned} &a^3 + ab(1 - 2a) - 2b^2 \\ &= a^3 + ab - 2a^2b - 2b^2 \\ &= a^3 - 2a^2b + ab - 2b^2 \\ &= a^2(a - 2b) + b(a - 2b) \\ &= (a - 2b)(a^2 + b) \end{aligned}$$

Question 27.

Solution:

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

Question 28.

Solution:

$$(ax + by)^2 + (bx - ay)^2$$

$$\begin{aligned}
 &= a^2x^2 + b^2y^2 + 2abxy + b^2x^2 + a^2y^2 - 2bxy \\
 &= a^2x^2 + b^2y^2 + b^2x^2 + a^2y^2 \\
 &= a^2x^2 + b^2x^2 + a^2y^2 + b^2y^2 \\
 &= x^2(a^2 + b^2) + y^2(a^2 + b^2) \\
 &= (a^2 + b^2)(x^2 + y^2)
 \end{aligned}$$

Question 29.

Solution:

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

Question 30.

Solution:

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

Question 31.

Solution:

$$\begin{aligned}
 &a^2x^2 + (ax^2 + 1)x + a \\
 &= a^2x^2 + ax^3 + x + a \\
 &= a^2x^2 + ax^3 + a + x \\
 &= ax^2(a + x) + 1(a + x) \\
 &= (a + x)(ax^2 + 1) \text{ Ans}
 \end{aligned}$$

Question 32.

Solution:

$$\begin{aligned} & ab(x^2 + 1) + x(a^2 + b^2) \\ &= abx^2 + ab + a^2x + b^2x \\ &= abx^2 + a^2x + b^2x + ab \\ &= ax(bx + a) + b(bx + a) \\ &= (bx + a)(ax + b) \end{aligned}$$

Question 33.

Solution:

$$\begin{aligned} & x^2 - (a + b)x + ab \\ &= x^2 - ax - bx + ab \\ &= x(x - a) - b(x - a) \\ &= (x - a)(x - b) \end{aligned}$$

Question 34.

Solution:

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