

Solution 19:

Exercise 5(B)

Solution 1:

$$\begin{aligned}a^2 + 10a + 24 &= a^2 + 6a + 4a + 24 \\ &= a(a + 6) + 4(a + 6) \\ &= (a + 6)(a + 4)\end{aligned}$$

Solution 2:

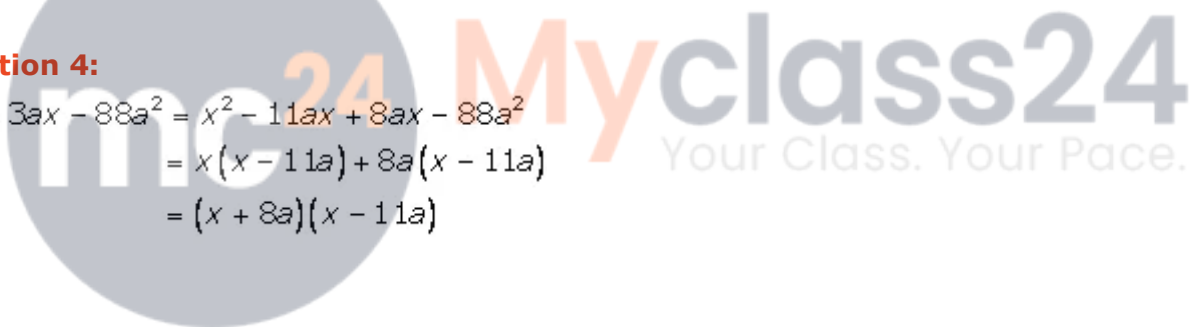
$$\begin{aligned}a^2 - 3a - 40 &= a^2 - 8a + 5a - 40 \\ &= a(a - 8) + 5(a - 8) \\ &= (a - 8)(a + 5)\end{aligned}$$

Solution 3:

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

Solution 4:

$$\begin{aligned}x^2 - 3ax - 88a^2 &= x^2 - 11ax + 8ax - 88a^2 \\ &= x(x - 11a) + 8a(x - 11a) \\ &= (x + 8a)(x - 11a)\end{aligned}$$



Solution 5:

$$\begin{aligned}6a^2 - a - 15 &= 6a^2 - 10a + 9a - 15 \\ &= 2a(3a - 5) + 3(3a - 5) \\ &= (2a + 3)(3a - 5)\end{aligned}$$

Solution 6:

$$\begin{aligned}24a^3 + 37a^2 - 5a &= a(24a^2 + 37a - 5) \\ &= a(24a^2 + 40a - 3a - 5) \\ &= a \times [8a(3a + 5) - 1(3a + 5)] \\ &= a[(8a - 1)(3a + 5)] \\ &= a(8a - 1)(3a + 5)\end{aligned}$$

Solution 7:

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

Solution 8:

$$\begin{aligned}a^2b^2 + 8ab - 9 &= a^2b^2 + 9ab - ab - 9 \\ &= ab(ab + 9) - 1(ab + 9) \\ &= (ab + 9)(ab - 1)\end{aligned}$$

Solution 9:

$$\begin{aligned}3 - a(4 + 7a) &= 3 - 4a - 7a^2 \\ &= 3 - 7a + 3a - 7a^2 \\ &= 1(3 - 7a) + a(3 - 7a) \\ &= (3 - 7a)(a + 1)\end{aligned}$$



Solution 10:

$$(2a + b)^2 - 6a - 3b - 4 = (2a + b)^2 - 3(2a + b) - 4$$

Assume that $2a + b = x$

Therefore,

$$\begin{aligned} (2a + b)^2 - 6a - 3b - 4 &= x^2 - 3x - 4 \\ &= x^2 - 4x + x - 4 \\ &= 1(x - 4) + x(x - 4) \\ &= (x + 1)(x - 4) \\ &= (2a + b + 1)(2a + b - 4) \end{aligned}$$

[resubstitute the value of x]

Solution 11:

Assume that $a + b = x$;

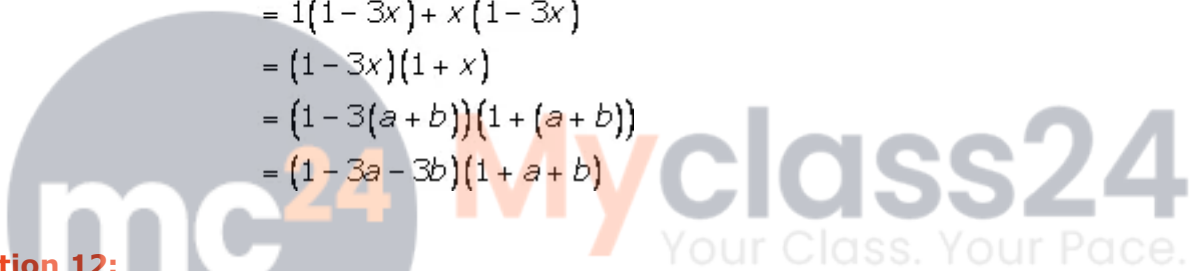
$$\begin{aligned} 1 - 2(a + b) - 3(a + b)^2 &= 1 - 2x - 3x^2 \\ &= 1 - 3x + x - 3x^2 \\ &= 1(1 - 3x) + x(1 - 3x) \\ &= (1 - 3x)(1 + x) \\ &= (1 - 3(a + b))(1 + (a + b)) \\ &= (1 - 3a - 3b)(1 + a + b) \end{aligned}$$

Solution 12:

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

Solution 13:

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



Solution 14:

Assume that $3x - 2y = a$

Therefore,

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

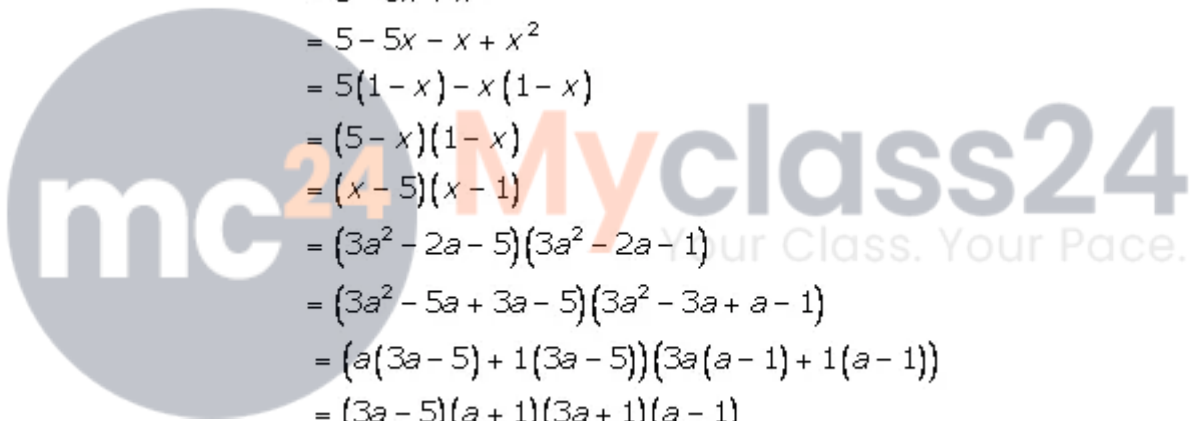
Solution 15:

$$5 - (3a^2 - 2a)(6 - 3a^2 + 2a) = 5 - (3a^2 - 2a)[6 - (3a^2 - 2a)]$$

Assume that $3a^2 - 2a = x$

Therefore,

$$\begin{aligned}
 5 - (3a^2 - 2a)(6 - 3a^2 + 2a) &= 5 - x(6 - x) \\
 &= 5 - 6x + x^2 \\
 &= 5 - 5x - x + x^2 \\
 &= 5(1 - x) - x(1 - x) \\
 &= (5 - x)(1 - x) \\
 &= (x - 5)(x - 1) \\
 &= (3a^2 - 2a - 5)(3a^2 - 2a - 1) \\
 &= (3a^2 - 5a + 3a - 5)(3a^2 - 3a + a - 1) \\
 &= (a(3a - 5) + 1(3a - 5))(3a(a - 1) + 1(a - 1)) \\
 &= (3a - 5)(a + 1)(3a + 1)(a - 1)
 \end{aligned}$$



(i) Given expression: $x^2 - 3x - 54$

Comparing with $ax^2 + bx + c$, we get $a = 1$, $b = -3$ and $c = -54$

$\therefore b^2 - 4ac = (-3)^2 - 4(1)(-54) = 9 + 216 = 225$, which is a perfect square.

$\therefore x^2 - 3x - 54$ is factorisable.

$$\begin{aligned}\text{Now, } x^2 - 3x - 54 &= x^2 - 9x + 6x - 54 \\ &= x(x - 9) + 6(x - 9) \\ &= (x - 9)(x + 6)\end{aligned}$$

(ii) Given expression: $2x^2 - 7x - 15$

Comparing with $ax^2 + bx + c$, we get $a = 2$, $b = -7$ and $c = -15$

$\therefore b^2 - 4ac = (-7)^2 - 4(2)(-15) = 49 + 120 = 169$, which is a perfect square.

$\therefore 2x^2 - 7x - 15$ is factorisable.

$$\begin{aligned}\text{Now, } 2x^2 - 7x - 15 &= 2x^2 - 10x + 3x - 15 \\ &= 2x(x - 5) + 3(x - 5) \\ &= (2x + 3)(x - 5)\end{aligned}$$

(iii) Given expression: $2x^2 + 2x - 75$

Comparing with $ax^2 + bx + c$, we get $a = 2$, $b = 2$ and $c = -75$

$\therefore b^2 - 4ac = (2)^2 - 4(2)(-75) = 4 + 600 = 604$, which is not a perfect square.

$\therefore 2x^2 + 2x - 75$ is not factorisable.

(iv) Given expression: $3x^2 + 4x - 10$

Comparing with $ax^2 + bx + c$, we get $a = 3$, $b = 4$ and $c = -10$

$\therefore b^2 - 4ac = (4)^2 - 4(3)(-10) = 16 + 120 = 136$, which is not a perfect square.

$\therefore 3x^2 + 4x - 10$ is not factorisable.

(v) Given expression: $x(2x - 1) - 1$

$$\text{Now, } x(2x - 1) - 1 = 2x^2 - x - 1$$

Comparing with $ax^2 + bx + c$, we get $a = 2$, $b = -1$ and $c = -1$

$\therefore b^2 - 4ac = (-1)^2 - 4(2)(-1) = 1 + 8 = 9$, which is a perfect square.

$\therefore 2x^2 - x - 1$ is factorisable.

$$\begin{aligned}\text{Now, } 2x^2 - x - 1 &= 2x^2 - 2x + x - 1 \\ &= 2x(x - 1) + 1(x - 1) \\ &= (2x + 1)(x - 1)\end{aligned}$$