Algebraic Expressions and Identities Ex 6.6 Q 10

Answer :

We have:

$$(x+y)^2 = x^2 + 2xy + y^2$$
$$\Rightarrow x^2 + y^2 = (x+y)^2 - 2xy$$
$$\Rightarrow x^2 + y^2 = 4^2 - 2 \times 2 \qquad (\because x + y = 4 \text{ and } xy = 2)$$
$$\Rightarrow x^2 + y^2 = 16 - 4$$
$$\Rightarrow x^2 + y^2 = 12$$

Algebraic Expressions and Identities Ex 6.6 Q11

Answer :

We have:

$$(x-y)^2 = x^2 - 2xy + y^2$$
$$\Rightarrow x^2 + y^2 = (x-y)^2 + 2xy$$
$$\Rightarrow x^2 + y^2 = 7^2 + 2 \times 9 \qquad (\because x - y = 7 \text{ and } xy = 9\ )$$
$$\Rightarrow x^2 + y^2 = 7^2 + 2 \times 9$$
$$\Rightarrow x^2 + y^2 = 49 + 18$$
$$\Rightarrow x^2 + y^2 = 67$$

Algebraic Expressions and Identities Ex 6.6 Q12

Answer :

We have:

$$(3x+5y)^2 = (3x)^2 + 2(3x)(5y) + (5y)^2$$
$$\Rightarrow (3x+5y)^2 = 9x^2 + 30xy + 25y^2$$
$$\Rightarrow 9x^2 + 25y^2 = (3x+5y)^2 - 30xy$$
$$\Rightarrow 9x^2 + 25y^2 = 11^2 - 30 \times 2 \qquad (\because 3x + 5y = 11 \text{ and } xy = 2)$$
$$\Rightarrow 9x^2 + 25y^2 = 121 - 60$$
$$\Rightarrow 9x^2 + 25y^2 = 61$$

Algebraic Expressions and Identities Ex 6.6 Q13

Answer :

(i) Let us consider the following expression:

$16x^2 + 24x + 9$

Now

$16x^2 + 24x + 9 = (4x + 3)^2$ (Using identity $(a+b)^2 = a^2 + 2ab + b^2$)

$\Rightarrow 16x^2 + 24x + 9 = \left(4 \times \frac{7}{4} + 3\right)^2$ $\left(\text{Substituting } x = \frac{7}{4}\right)$

$\Rightarrow 16x^2 + 24x + 9 = (7 + 3)^2$

$\Rightarrow 16x^2 + 24x + 9 = 10^2$

$\Rightarrow 16x^2 + 24x + 9 = 100$

(ii) Let us consider the following expression:

$64x^2 + 81y^2 + 144xy$

Now

$64x^2 + 81y^2 + 144xy = (8x + 9y)^2$ (Using identity $(a+b)^2 = a^2 + 2ab + b^2$)

$\Rightarrow 64x^2 + 81y^2 + 144xy = \left[8(11) + 9\left(\frac{4}{3}\right)\right]^2$

$\left(\text{Substituting } x = 11 \text{ and } y = \frac{4}{3}\right)$

$\Rightarrow 64x^2 + 81y^2 + 144xy = [88 + 12]^2$

$\Rightarrow 64x^2 + 81y^2 + 144xy = 100^2$

$\Rightarrow 64x^2 + 81y^2 + 144xy = 10000$

(iii) Let us consider the following expression:

$81x^2 + 16y^2 - 72xy$

Now

$81x^2 + 16y^2 - 72xy = (9x - 4y)^2$ (Using identity $(a+b)^2 = a^2 - 2ab + b^2$)

$\Rightarrow 81x^2 + 16y^2 - 72xy = \left[9\left(\frac{2}{3}\right) - 4\left(\frac{3}{4}\right)\right]^2$ $\left(\text{Substituting } x = \frac{2}{3} \text{ and } y = \frac{3}{4}\right)$

$\Rightarrow 81x^2 + 16y^2 - 72xy = [6 - 3]^2$

$\Rightarrow 81x^2 + 16y^2 - 72xy = 3^2$

$\Rightarrow 81x^2 + 16y^2 - 72xy = 9$

********** END **********