



Algebraic Identities Ex 4.1 Q9

Answer :

In the given problem, we have to find $3x + 5y$

We have been given $9x^2 + 25y^2 = 181$ and $xy = -6$

Let us take $3x + 5y$

We shall use the identity $(x + y)^2 = x^2 + 2xy + y^2$

$$\begin{aligned}(3x + 5y)^2 &= (3x)^2 + (5y)^2 + 2 \times 3x \times 5y \\ &= 3x \times 3x + 5y \times 5y + 2 \times 3x \times 5y \\ &= 9x^2 + 25y^2 + 30xy\end{aligned}$$

By substituting $9x^2 + 25y^2 = 181$ and $xy = -6$ we get,

$$\begin{aligned}(3x + 5y)^2 &= [9x^2 + 25y^2] + 30[xy] \\ &= 181 + 30(-6) \\ &= 181 - 180 \\ &= 1\end{aligned}$$

Hence the value of $3x + 5y$ is $\boxed{\pm 1}$.

Algebraic Identities Ex 4.1 Q10

Answer :

In the given problem, we have to find $4x^2 + 9y^2$

We have been given $2x + 3y = 8$ and $xy = 2$

Let us take $2x + 3y = 8$

On squaring both sides we get,

$$(2x + 3y)^2 = (8)^2$$

We shall use the identity $(x + y)^2 = x^2 + 2xy + y^2$

$$(2x \times 2x + 3y \times 3y + 2 \times 2x \times 3y) = 64$$

$$4x^2 + 9y^2 + 12xy = 64$$

$$4x^2 + 9y^2 + 12[xy] = 64$$

By substituting $xy = 2$ we get,

$$4x^2 + 9y^2 + 12[2] = 64$$

$$4x^2 + 9y^2 + 24 = 64$$

$$4x^2 + 9y^2 = 64 - 24$$

$$4x^2 + 9y^2 = 40$$

Hence the value of $4x^2 + 9y^2$ is 40

Answer :

In the given problem, we have to find $9x^2 + 49y^2$

We have been given $3x - 7y = 10$ and $xy = -1$

Let us take $3x - 7y = 10$

On squaring both sides we get,

$$(3x - 7y)^2 = (10)^2$$

$$(3x \times 3x + 7y \times 7y - 2 \times 3x \times 7y) = 100$$

We shall use the identity $(x - y)^2 = x^2 - 2xy + y^2$

$$9x^2 + 49y^2 - 42xy = 100$$

$$9x^2 + 49y^2 - 42[xy] = 100$$

By substituting $xy = -1$ we get,

$$9x^2 + 49y^2 - 42[-1] = 100$$

$$9x^2 + 49y^2 + 42 = 100$$

$$9x^2 + 49y^2 = 100 - 42$$

$$9x^2 + 49y^2 = 58$$

Hence the value of $9x^2 + 49y^2$ is 58.

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