



Algebraic Identities Ex 4.1 Q3

Answer :

In the given problem, we have to simplify expressions

(i) Given $175 \times 175 + 2 \times 175 \times 25 + 25 \times 25$

Put $x = 175$

$y = 25$

Hence the equation becomes $x \times x + 2 \times x \times y + y \times y$,

That is

$$\begin{aligned}x^2 + 2xy + y^2 &= (x + y)^2 \\&= (175 + 25)^2 \\&= (200)^2 \\&= 40000\end{aligned}$$

Hence the value of $175 \times 175 + 2 \times 175 \times 25 + 25 \times 25$ is 40000

(ii) We have been given $322 \times 322 - 2 \times 322 \times 22 + 22 \times 22$

Put $x = 322$

$y = 22$

Hence the equation becomes $x \times x - 2 \times x \times y + y \times y$

That is

$$\begin{aligned}x^2 - 2xy + y^2 &= (x - y)^2 \\&= (322 - 22)^2 \\&= (300)^2 \\&= 90000\end{aligned}$$

Hence the value of $322 \times 322 - 2 \times 322 \times 22 + 22 \times 22$ is 90000

(iii) Given $0.76 \times 0.76 + 2 \times 0.76 \times 0.24 + 0.24 \times 0.24$

Put $x = 0.76$

$y = 0.24$

Hence the equation becomes $x \times x + 2 \times x \times y + y \times y$

That is

$$\begin{aligned}x^2 + 2xy + y^2 &= (x + y)^2 \\&= (0.76 + 0.24)^2 \\&= (1.00)^2 \\&= 1\end{aligned}$$

Hence the value of $0.76 \times 0.76 + 2 \times 0.76 \times 0.24 + 0.24 \times 0.24$ is 1

(iv) We have been given $\frac{7.83 \times 7.83 - 1.17 \times 1.17}{6.66}$

Put $x = 7.83$

$y = 1.17$

Hence the equation becomes $\frac{x \times x - y \times y}{6.66}$

$$\begin{aligned}\text{That } \frac{x \times x - y \times y}{6.66} &= \frac{x^2 - y^2}{6.66} \\ &= \frac{(x + y)(x - y)}{6.66} \\ &= \frac{(7.83 + 1.17)(7.83 - 1.17)}{6.66} \\ &= \frac{(9.00)(6.66)}{(6.66)} \\ &= 9.00\end{aligned}$$

Hence the value of $\frac{7.83 \times 7.83 - 1.17 \times 1.17}{6.66}$ is 9

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