



Algebraic Identities Ex 4.1 Q2

Answer :

In the given problem, we have to evaluate expressions by using identities.

(i) Given $(399)^2$

We can write $(399)^2$ as $(400-1)^2$

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

Where $x = 400$, $y = 1$

By applying in identity we get

$$400-12=4002-2\times 400\times 1+12=400\times 400-800+1=160000-800+1=159201$$

Hence the value of $(399)^2$ is $\boxed{159201}$

(ii) We have been given $(0.98)^2$

We can write $(0.98)^2$ as $(1-0.02)^2$

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

Where $x = 1$, $y = 0.02$

By applying in identity we get

$$\begin{aligned}(1-0.02)^2 &= (1)^2 - 2 \times 0.02 \times 1 + (0.02)^2 \\ &= (1 \times 1) - 2 \times 0.02 \times 1 + (0.02 \times 0.02) \\ &= (1 - 0.04 + 0.004) \\ &= 0.9604\end{aligned}$$

Hence the value of $(0.98)^2$ is $\boxed{0.9604}$

(iii) The given expression is 991×1009

$$\text{We have } \frac{991+1009}{2} = 1000$$

So we can express 991 and 1009 in the terms of 1000 as

$$991 = 1000 - 9$$

$$1009 = 1000 + 9$$

$$991 \times 1009 = (1000 - 9)(1000 + 9)$$

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

Here

$$(x-y) = (1000-9)$$

$$(x+y) = (1000+9)$$

By applying in identity we get

$$\begin{aligned}(1000-9)(1000+9) &= (1000)^2 - (9)^2 \\ &= 1000000 - 81 \\ &= 999919\end{aligned}$$

Hence the value of 991×1009 is $\boxed{999919}$

(iv) The given expression is 117×83

We have

$$\frac{117+83}{2} = \frac{200}{2}$$
$$= 100$$

So we can express 117 and 83 in the terms of 100 as

$$117 = 100 + 17$$

$$83 = 100 - 17$$

$$117 \times 83 = (100 + 17)(100 - 17)$$

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

Here

$$(x + y) = 100 + 17$$

$$(x - y) = 100 - 17$$

By applying in identity we get

$$(100 + 17)(100 - 17) = (100)^2 - (17)^2$$
$$= 10000 - 289$$
$$= 9711$$

Hence the value of 117×83 is 9711

***** END *****