Algebraic Expressions and Identities Ex 6.6 Q7

Answer :

Let us consider the following equation:

$x+\frac{1}{x}=20$

Squaring both sides, we get:

$\left(x+\frac{1}{x}\right)^2=(20)^2=400$

$\Rightarrow \left(x+\frac{1}{x}\right)^2=400$

$\Rightarrow x^2+2\times x\times \frac{1}{x}+\left(\frac{1}{x}\right)^2=400 \qquad \left[\left(a+b\right)^2=a^2+b^2+2ab\right]$

$\Rightarrow x^2+2+\frac{1}{x^2}=400$

$\Rightarrow x^2+\frac{1}{x^2}=398$ (Subtracting 2 from both sides)

Thus, the answer is 398.

Algebraic Expressions and Identities Ex 6.6 Q8

Answer :

Let us consider the following equation:

$x-\frac{1}{x}=3$

Squaring both sides, we get:

$\left(x-\frac{1}{x}\right)^2=(3)^2=9$

$\Rightarrow \left(x-\frac{1}{x}\right)^2=9$

$\Rightarrow x^2-2\times x\times \frac{1}{x}+\left(\frac{1}{x}\right)^2=9$

$\Rightarrow x^2-2+\frac{1}{x^2}=9$

$\Rightarrow x^2+\frac{1}{x^2}=11$ (Adding 2 to both sides)

Squaring both sides again, we get:

$\left(x^2+\frac{1}{x^2}\right)^2=(11)^2=121$

$\Rightarrow \left(x^2+\frac{1}{x^2}\right)^2=121$

$$\Rightarrow \left(x^2\right)^2 + 2\left(x^2\right)\left(\frac{1}{x^2}\right) + \left(\frac{1}{x^2}\right)^2 = 121$$

$$\Rightarrow x^4 + 2 + \frac{1}{x^4} = 121$$

$$\Rightarrow x^4 + \frac{1}{x^4} = 119$$

Algebraic Expressions and Identities Ex 6.6 Q9

Answer :

Let us consider the following expression:

$x + \frac{1}{x}$

Squaring the above expression, we get:

$$\left(x + \frac{1}{x}\right)^2 = x^2 + 2 \times x \times \frac{1}{x} + \left(\frac{1}{x}\right)^2 = x^2 - 2 + \frac{1}{x^2}$$

$$\left[\left(a+b\right)^2 = a^2 + b^2 + 2ab\right]$$

$$\Rightarrow \left(x + \frac{1}{x}\right)^2 = x^2 + 2 + \frac{1}{x^2}$$

$$\Rightarrow \left(x + \frac{1}{x}\right)^2 = 20 \qquad \left(\because x^2 + \frac{1}{x^2} = 18\right)$$

$\Rightarrow x + \frac{1}{x} = \pm\sqrt{20}$ (Taking square root of both sides)

Now, let us consider the following expression:

$x - \frac{1}{x}$

Squaring the above expression, we get:

$x - \frac{1}{x}$

Squaring the above expression, we get:

$$\left(x - \frac{1}{x}\right)^2 = x^2 - 2 \times x \times \frac{1}{x} + \left(\frac{1}{x}\right)^2 = x^2 - 2 + \frac{1}{x^2}$$

$$\left[\left(a-b\right)^2 = a^2 + b^2 - 2ab\right]$$

$$\Rightarrow \left(x - \frac{1}{x}\right)^2 = x^2 - 2 + \frac{1}{x^2}$$

$$\Rightarrow \left(x - \frac{1}{x}\right)^2 = 16 \qquad \left(\because x^2 + \frac{1}{x^2} = 18\right)$$

$\Rightarrow x - \frac{1}{x} = \pm 4$ (Taking square root of both sides)

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