Algebraic Identities Ex 4.1 Q4

**Answer :**

In the given problem, we have to find $x^2+\frac{1}{x^2}$

Given $x+\frac{1}{x}=11$

On squaring both sides we get,

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

$$x^2+\frac{1}{x^2}+2\times \cancel{x}\times\frac{1}{\cancel{x}}=(11)^2$$

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

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

$$x^2+\frac{1}{x^2}=119$$

Hence the value of $x^2+\frac{1}{x^2}$ is $\boxed{119}$.

Algebraic Identities Ex 4.1 Q5

**Answer :**

In the given problem, we have to find $x^2+\frac{1}{x^2}$

Given $\left(x-\frac{1}{x}\right)=-1$

On squaring both sides we get,

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

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

$$x^2+\frac{1}{x^2}-2\times \cancel{x}\times\frac{1}{\cancel{x}}=-1\times-1$$

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

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

$$x^2+\frac{1}{x^2}=3$$

Hence the value of $x^2+\frac{1}{x^2}$ is $\boxed{3}$.

Algebraic Identities Ex 4.1 Q6

**Answer :**

In the given problem, we have to find $x^2+\frac{1}{x^2}$ and $x^4+\frac{1}{x^4}$

We have $x+\frac{1}{x}=\sqrt{5}$

On squaring both sides we get,

$$\left(x+\frac{1}{x}\right)^2=\left(\sqrt{5}\right)^2$$

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

$$x^2+\frac{1}{x^2}+2\times \cancel{x}\times\frac{1}{\cancel{x}}=\sqrt{5}\times\sqrt{5}$$

$$x^2+\frac{1}{x^2}+2=5$$

$$x^2+\frac{1}{x^2}=5-2$$

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

Again squaring on both sides we get,

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

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

$$x^4+\frac{1}{x^4}+2\times \cancel{x^2}\times\frac{1}{\cancel{x^2}}=9$$

$$x^4+\frac{1}{x^4}+2=9$$

$$x^4+\frac{1}{x^4}=9-2$$

$$x^4+\frac{1}{x^4}=7$$

Hence the value of $x^2+\frac{1}{x^2}$ is $\boxed{3}$ and $x^4+\frac{1}{x^4}$ is $\boxed{7}$.

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