Rationalisation Ex 3.2 Q9

Answer :

We know that rationalization factor for $\sqrt{5}-\sqrt{3}$ is $\sqrt{5}+\sqrt{3}$. We will multiply denominator and numerator of the given expression $\frac{6}{\sqrt{5}-\sqrt{3}}$ by $\sqrt{5}+\sqrt{3}$, to get

$$\begin{aligned}\frac{6}{\sqrt{5}-\sqrt{3}}\times\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}}&=\frac{6\sqrt{5}+6\sqrt{3}}{\left(\sqrt{5}\right)^2-\left(\sqrt{3}\right)^2}\\&=\frac{6\sqrt{5}+6\sqrt{3}}{5-3}\\&=\frac{6\sqrt{5}+6\sqrt{3}}{2}\\&=3\sqrt{5}+3\sqrt{3}\end{aligned}$$

Putting the values of $\sqrt{5}$ and $\sqrt{3}$, we get

$$\begin{aligned}3\sqrt{5}+3\sqrt{3}&=3(2.236)+3(1.732)\\&=6.708+5.196\\&=11.904\end{aligned}$$

Hence value of the given expression is $\boxed{11.904}$.

Rationalisation Ex 3.2 Q10

Answer :

(i) We know that rationalization factor for $3+2\sqrt{5}$ is $3-2\sqrt{5}$. We will multiply numerator and denominator of the given expression $\frac{3-\sqrt{5}}{3+2\sqrt{5}}$ by $3-2\sqrt{5}$, to get

$$\begin{aligned}\frac{3-\sqrt{5}}{3+2\sqrt{5}}\times\frac{3-2\sqrt{5}}{3-2\sqrt{5}}&=\frac{(3)^2-3\times2\times\sqrt{5}-3\times\sqrt{5}+2\times\left(\sqrt{5}\right)^2}{(3)^2-\left(2\sqrt{5}\right)^2}\\&=\frac{9-9\sqrt{5}+10}{9-20}\\&=\frac{19-9\sqrt{5}}{-11}\\&=\frac{9\sqrt{5}-19}{11}\end{aligned}$$

Putting the values of $\sqrt{5}$, we get

$$\begin{aligned}\frac{9\sqrt{5}-19}{11}&=\frac{9(2.236)-19}{11}\\&=\frac{20.124-19}{11}\\&=\frac{1.124}{11}\\&=0.102\end{aligned}$$

Hence the given expression is simplified to $\boxed{0.102}$.

(ii) We know that rationalization factor for $3-2\sqrt{2}$ is $3+2\sqrt{2}$. We will multiply numerator and denominator of the given expression $\frac{1+\sqrt{2}}{3-2\sqrt{2}}$ by $3+2\sqrt{2}$, to get

$$\frac{1+\sqrt{2}}{3-2\sqrt{2}}\times\frac{3+2\sqrt{2}}{3+2\sqrt{2}}=\frac{3+2\times\sqrt{2}+3\times\sqrt{2}+2\times\left(\sqrt{2}\right)^2}{(3)^2-\left(2\sqrt{2}\right)^2}$$

$$=\frac{3+2\sqrt{2}+3\sqrt{2}+4}{9-8}$$

$$=\frac{7+5\sqrt{2}}{1}$$

$$=7+5\sqrt{2}$$

Putting the value of $\sqrt{2}$, we get

$$7+5\sqrt{2}=7+5(1.4142)$$

$$=7+7.071$$

$$=14.071$$

Hence the given expression is simplified to $\boxed{14.071}$.

Rationalisation Ex 3.2 Q11

Answer :

We have, $x=\frac{\sqrt{3}+1}{2}$

It can be simplified as

$$2x-1=\sqrt{3}$$

On squaring both sides, we get

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

$$(2x)^2+1-2\times2x=3$$

$$4x^2+1-4x=3$$

$$4x^2-4x-2=0$$

The given equation can be rewritten as. $4x^3+2x^2-8x+7=x\left(4x^2-4x-2\right)+\frac{6}{4}\left(4x^2-4x-2\right)+3+7$

Therefore, we have

$$4x^3+2x^2-8x+7=x(0)+\frac{6}{4}(0)+3+7$$

$$=3+7$$

$$=10$$

Hence, the value of given expression is $\boxed{10}$.

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