Rationalisation Ex 3.2 Q2

Answer :

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

$$\begin{aligned}\frac{2}{\sqrt{3}}\times\frac{\sqrt{3}}{\sqrt{3}}&=\frac{2\times\sqrt{3}}{\sqrt{3}\times\sqrt{3}}\\&=\frac{2\sqrt{3}}{3}\\&=\frac{2\times1.732}{3}\\&=\frac{3.4641}{3}\\&=1.1547\end{aligned}$$

The value of expression 1.1547 can be round off to three decimal places as 1.155.

Hence the given expression is simplified to $\boxed{1.155}$.

(ii) We know that rationalization factor of the denominator is $\sqrt{10}$. We will multiply numerator and denominator of the given expression $\frac{3}{\sqrt{10}}$ by $\sqrt{10}$, to get

$$\begin{aligned}\frac{3}{\sqrt{10}}\times\frac{\sqrt{10}}{\sqrt{10}}&=\frac{3\times\sqrt{10}}{\sqrt{10}\times\sqrt{10}}\\&=\frac{3\sqrt{10}}{10}\\&=\frac{3\times3.162}{10}\\&=\frac{9.486}{10}\\&=0.9486\end{aligned}$$

The value of expression 0.9486 can be round off to three decimal places as 0.949.

Hence the given expression is simplified to $\boxed{0.949}$.

(iii) We know that rationalization factor of the denominator is $\sqrt{2}$. We will multiply numerator and denominator of the given expression $\frac{\sqrt{5}+1}{\sqrt{2}}$ by $\sqrt{2}$, to get

$$\begin{aligned}\frac{\sqrt{5}+1}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}}&=\frac{\sqrt{10}+\sqrt{2}}{\sqrt{2}\times\sqrt{2}}\\&=\frac{\sqrt{10}+\sqrt{2}}{2}\\&=\frac{3.162+1.414}{2}\\&=\frac{4.576}{2}\\&=2.288\end{aligned}$$

The value of expression 2.288 can be round off to three decimal places as 2.288.

Hence the given expression is simplified to $\boxed{2.288}$.

(iv) We know that rationalization factor of the denominator is $\sqrt{2}$. We will multiply numerator and denominator of the given expression $\frac{\sqrt{10}+\sqrt{15}}{\sqrt{2}}$ by $\sqrt{2}$, to get

$$\begin{aligned}\frac{\sqrt{10}+\sqrt{15}}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}}&=\frac{\sqrt{10}\times\sqrt{2}+\sqrt{15}\times\sqrt{2}}{\sqrt{2}\times\sqrt{2}}\\&=\frac{\sqrt{10}\times\sqrt{2}+\sqrt{5}\times\sqrt{3}\times\sqrt{2}}{2}\\&=\frac{3.162\times1.414+2.236\times1.732\times1.414}{2}\\&=\frac{9.947}{2}\\&=4.9746\end{aligned}$$

The value of expression 4.9746 can be round off to three decimal places as 4.975.

Hence the given expression is simplified to $\boxed{4.975}$.

(v) Given that $\frac{2+\sqrt{3}}{2}$

Putting the value of $\sqrt{3}$, we get

$$\frac{2+\sqrt{3}}{2} = \frac{2+1.732}{2}$$
$$= \frac{3.732}{2}$$
$$= 1.24401$$

The value of expression 1.24401 can be round off to three decimal places as 1.244.

Hence the given expression is simplified to $\boxed{1.244}$.

(vi) We know that rationalization factor of the denominator is $\sqrt{5}$. We will multiply numerator and denominator of the given expression $\frac{\sqrt{2}-1}{\sqrt{5}}$ by $\sqrt{5}$, to get

$$\frac{\sqrt{2}-1}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{2}\times\sqrt{5}-\sqrt{5}}{\sqrt{5}\times\sqrt{5}}$$
$$= \frac{\sqrt{10}-\sqrt{5}}{5}$$

Putting the value of $\sqrt{10}$ and $\sqrt{5}$, we get

$$\frac{\sqrt{10}-\sqrt{5}}{5} = \frac{3.162-2.236}{5}$$
$$= \frac{0.926}{5}$$
$$= 0.1852$$

The value of expression 0.1852 can be round off to three decimal places as 0.185.

Hence the given expression is simplified to $\boxed{0.185}$.

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