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Rationalisation Ex 3.1 Q1

Answer :

(i) We know that $\sqrt[n]{a} \times \sqrt[n]{b} = \sqrt[n]{ab}$. We will use this property to simplify the expression $\sqrt[3]{4} \times \sqrt[3]{16}$.

$\therefore \sqrt[3]{4} \times \sqrt[3]{16} = \sqrt[3]{64}$

$= \sqrt[3]{4^3}$

$= \left(4^3\right)^{\frac{1}{3}}$

$= (4)^1$

$= 4$

Hence the value of the given expression is $\boxed{4}$.

(ii) We know that $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$. We will use this property to simplify the expression $\frac{\sqrt[4]{1250}}{\sqrt[4]{2}}$.

$\therefore \frac{\sqrt[4]{1250}}{\sqrt[4]{2}} = \sqrt[4]{625}$

$= \sqrt[4]{5^4}$

$= \left(5^4\right)^{\frac{1}{4}}$

$= (5)^1$

$= 5$

Hence the value of the given expression is $\boxed{5}$.

Rationalisation Ex 3.1 Q2

Answer :

(i) We can simplify the expression $\left(4+\sqrt{7}\right)\left(3+\sqrt{2}\right)$ as

$$\begin{aligned}\left(4+\sqrt{7}\right)\left(3+\sqrt{2}\right) &= 4\times 3+4\times\sqrt{2}+3\times\sqrt{7}+\sqrt{7}\times\sqrt{2}\\ &= 12+4\sqrt{2}+3\sqrt{7}+\sqrt{7\times 2}\\ &= 12+4\sqrt{2}+3\sqrt{7}+\sqrt{14}\end{aligned}$$

Hence the value of the expression is $12+4\sqrt{2}+3\sqrt{7}+\sqrt{14}$

(ii) We can simplify the expression $\left(3+\sqrt{3}\right)\left(5-\sqrt{2}\right)$ as

$$\begin{aligned}\left(3+\sqrt{3}\right)\left(5-\sqrt{2}\right) &= 3\times 5-3\times\sqrt{2}+5\times\sqrt{3}-\sqrt{3}\times\sqrt{2}\\ &= 15-3\sqrt{2}+5\sqrt{3}-\sqrt{3\times 2}\\ &= 15-3\sqrt{2}+5\sqrt{3}-\sqrt{6}\end{aligned}$$

Hence the value of the expression is $15-3\sqrt{2}+5\sqrt{3}-\sqrt{6}$

(iii) We can simplify the expression $\left(\sqrt{5}-2\right)\left(\sqrt{3}-\sqrt{5}\right)$ as

$$\begin{aligned}\left(\sqrt{5}-2\right)\left(\sqrt{3}-\sqrt{5}\right) &= \sqrt{5}\times\sqrt{3}-\sqrt{5}\times\sqrt{5}-2\times\sqrt{3}+2\times\sqrt{5}\\ &= \sqrt{15}-\sqrt{5\times 5}-2\sqrt{3}+2\sqrt{5}\\ &= \sqrt{15}-\left(5^2\right)^{\frac{1}{2}}-2\sqrt{3}+2\sqrt{5}\\ &= \sqrt{15}-5^1-2\sqrt{3}+2\sqrt{5}\end{aligned}$$

Hence the value of the expression is $\sqrt{15}-2\sqrt{3}+2\sqrt{5}-5$.

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