



Rationalising surds (1)

Getting ready for A-Level Maths...

*"The most important investment you can make is in **yourself**."*

Rationalising surds (1)

Making life simpler...

$$\frac{8}{0.1}$$

Rationalising surds (1)

Making life simpler...

$$\frac{8}{\sqrt{2}}$$

Rationalising surds (1)

My turn

Rationalise $\frac{1}{\sqrt{2}}$

$$\frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$$

$$\underline{\underline{\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}}}$$

Your turn

Rationalise $\frac{1}{\sqrt{7}}$

$$\frac{1}{\sqrt{7}} = \frac{1}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}}$$

$$\underline{\underline{\frac{1}{\sqrt{7}} = \frac{\sqrt{7}}{7}}}$$

Rationalising surds (1)

My turn

Rationalise $\frac{4}{\sqrt{2}}$

Give your answer in the form $a\sqrt{b}$
where b is prime and state a and b .

$$\frac{4}{\sqrt{2}} = \frac{4}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$$

$$= \frac{4\sqrt{2}}{2}$$

$$\underline{\underline{\frac{4}{\sqrt{2}} = 2\sqrt{2}}}$$

$$\begin{array}{l} a=2 \\ b=2 \end{array}$$

Your turn

Rationalise $\frac{21}{\sqrt{7}}$

Give your answer in the form $a\sqrt{b}$
where b is prime and state a and b .

$$\frac{21}{\sqrt{7}} = \frac{21}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}}$$

$$= \frac{21\sqrt{7}}{7}$$

$$\underline{\underline{\frac{21}{\sqrt{7}} = 3\sqrt{7}}}$$

$$\begin{array}{l} a=3 \\ b=7 \end{array}$$

Rationalising surds (1)

My turn

Rationalise $\frac{15}{2\sqrt{5}}$

Give your answer in the form $a\sqrt{b}$ where a is in simplest form and b is prime. State a and b .

$$\frac{15}{2\sqrt{5}} = \frac{15}{2\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$$

$$= \frac{\cancel{15}\sqrt{5}}{2 \times \cancel{5}}$$

$$= \frac{3\sqrt{5}}{2}$$

$$\frac{15}{2\sqrt{5}} = \frac{3}{2}\sqrt{5}$$

$$a = \frac{3}{2} \quad b = 5$$

Your turn

Rationalise $\frac{14}{5\sqrt{7}}$

Give your answer in the form $a\sqrt{b}$ where a is in simplest form and b is prime. State a and b .

$$\frac{14}{5\sqrt{7}} = \frac{14}{5\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}}$$

$$= \frac{\cancel{14}\sqrt{7}}{5 \times \cancel{7}}$$

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

$$\frac{14}{5\sqrt{7}} = \frac{2}{5}\sqrt{7}$$

$$a = \frac{2}{5} \quad b = 7$$

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My turn

Simplify the following, giving your answer in the form $a\sqrt{b}$. State a and b .

$$\frac{\sqrt{54}}{3} + \frac{12}{\sqrt{6}}$$

$$\frac{\sqrt{54}}{3} + \frac{12}{\sqrt{6}} = \frac{\sqrt{9 \times 6}}{3} + \frac{12}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}}$$

$$= \frac{\sqrt[3]{9 \times 6}}{3} + \frac{12\sqrt{6}}{6}$$

$$= 1\sqrt{6} + 2\sqrt{6}$$

$$\frac{\sqrt{54}}{3} + \frac{12}{\sqrt{6}} = 3\sqrt{6}$$

$$a=3 \quad b=6$$

Your turn

Simplify the following, giving your answer in the form $a\sqrt{b}$. State a and b .

$$\frac{\sqrt{63}}{3} + \frac{21}{\sqrt{7}}$$

$$\frac{\sqrt{63}}{3} + \frac{21}{\sqrt{7}} = \frac{\sqrt{9 \times 7}}{3} + \frac{21}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}}$$

$$= \frac{\sqrt[3]{9 \times 7}}{3} + \frac{21\sqrt{7}}{7}$$

$$= 1\sqrt{7} + 3\sqrt{7}$$

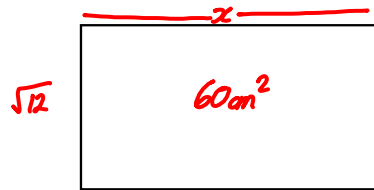
$$\frac{\sqrt{63}}{3} + \frac{21}{\sqrt{7}} = 4\sqrt{7}$$

$$a=4 \quad b=7$$

Rationalising surds (1)

My turn

A rectangle has an area of 60 cm^2 and a width of $\sqrt{12} \text{ cm}$. Find the length and state your answer in the form $a\sqrt{b}$ where b is prime.



$$\sqrt{12} \times x = 60$$

$$x = \frac{60}{\sqrt{12}}$$

$$= \frac{60}{\sqrt{12}} \times \frac{\sqrt{12}}{\sqrt{12}}$$

$$= \frac{60\sqrt{12}}{12}$$

$$= 5\sqrt{12} \quad \text{WI}$$

$$= 5 \times 2\sqrt{3}$$

$$= 10\sqrt{3} \text{ cm}$$

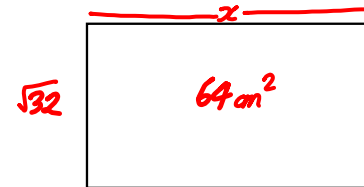
$$\text{WI } \sqrt{12} = \sqrt{4 \times 3}$$

$$= \sqrt{4}\sqrt{3}$$

$$= 2\sqrt{3}$$

Your turn

A rectangle has an area of 64 cm^2 and a width of $\sqrt{32} \text{ cm}$. Find the length and state your answer in the form $a\sqrt{b}$ where b is prime.



$$\sqrt{32} \times x =$$

$$x = \frac{64}{\sqrt{32}}$$

$$= \frac{64}{\sqrt{32}} \times \frac{\sqrt{32}}{\sqrt{32}}$$

$$= \frac{64\sqrt{32}}{32}$$

$$= 2\sqrt{32} \quad \text{WI}$$

$$= 2 \times 4\sqrt{2}$$

$$= 8\sqrt{2} \text{ cm}$$

$$\text{WI } \sqrt{32} = \sqrt{16 \times 2}$$

$$= \sqrt{16}\sqrt{2}$$

$$= 4\sqrt{2}$$

Rationalising surds (1)

Review Exercise

1. Rationalise $\frac{1}{\sqrt{3}}$
2. Rationalise $\frac{35}{\sqrt{5}}$. Give your answer in the form $a\sqrt{b}$ where b is prime and state a and b .
3. Rationalise $\frac{30}{4\sqrt{3}}$. Give your answer in the form $a\sqrt{b}$ where a is in simplest form and b is prime. State a and b .
4. Simplify the following, giving your answer in the form $a\sqrt{b}$. State a and b . $\frac{\sqrt{50}}{5} + \frac{26}{\sqrt{2}}$
5. A rectangle has an area of 80 cm^2 and a width of $\sqrt{20} \text{ cm}$. Find the length and state your answer in the form $a\sqrt{b}$ where b is prime.

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Review Exercise (Answers)

1. Rationalise $\frac{1}{\sqrt{3}}$ $\frac{\sqrt{3}}{3}$
2. Rationalise $\frac{35}{\sqrt{5}}$. Give your answer in the form $a\sqrt{b}$ where b is prime and state a and b . $7\sqrt{5}$
 $a=7, b=5$
3. Rationalise $\frac{30}{4\sqrt{3}}$. Give your answer in the form $a\sqrt{b}$ where a is in simplest form and b is prime. State a and b . $\frac{5}{2}\sqrt{3}$
 $a=\frac{5}{2}, b=3$
4. Simplify the following, giving your answer in the form $a\sqrt{b}$. State a and b . $\frac{\sqrt{50}}{5} + \frac{26}{\sqrt{2}}$ $14\sqrt{2}$
 $a=14, b=2$
5. A rectangle has an area of 80 cm^2 and a width of $\sqrt{20} \text{ cm}$. Find the length and state your answer in the form $a\sqrt{b}$ where b is prime. $8\sqrt{5}$