

SURDS

EXAM PAST PAPER QUESTIONS

1)

Express $\sqrt{18} - \sqrt{2} + \sqrt{72}$ as a surd in its simplest form.

3

$$\sqrt{18} - \sqrt{2} + \sqrt{72}$$

$$= \sqrt{9\sqrt{2}} - \sqrt{2} + \sqrt{36\sqrt{2}} \quad \checkmark$$

$$= 3\sqrt{2} - \sqrt{2} + 6\sqrt{2} \quad \checkmark$$

$$= 8\sqrt{2} \quad \checkmark$$

2)

Express $\sqrt{12} + 5\sqrt{3} - \sqrt{27}$ as a surd in its simplest form.

$$\sqrt{12} + 5\underline{\sqrt{3}} - \sqrt{27}$$

$$= \sqrt{4\underline{\sqrt{3}}} + 5\underline{\sqrt{3}} - \sqrt{9\underline{\sqrt{3}}} \quad \checkmark$$

$$= 2\sqrt{3} + 5\sqrt{3} - 3\sqrt{3} \quad \checkmark$$

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

3) Express $\frac{12}{\sqrt{2}}$ with a rational denominator.

Give your answer in its simplest form.

$$\frac{12}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$$

$$= \frac{12\sqrt{2}}{\sqrt{4}}$$

$$= \frac{12\sqrt{2}}{2}$$

$$= 6\sqrt{2}$$

4) Express $\frac{\sqrt{40}}{\sqrt{2}}$ as a surd in its simplest form.

$$\frac{\sqrt{40}}{\sqrt{2}}$$

$$\frac{\sqrt{40}}{\sqrt{2}} = \sqrt{40} \div \sqrt{2} = \sqrt{20}$$

$$= \sqrt{20} \quad \checkmark$$

$$= \sqrt{4} \sqrt{5}$$

$$= 2\sqrt{5} \quad \checkmark$$

4) Express $\frac{\sqrt{40}}{\sqrt{2}}$ as a surd in its simplest form.

$$\frac{\sqrt{40}}{\sqrt{2}}$$

$$= \frac{\sqrt{20}\sqrt{2}}{\sqrt{2}}$$

$$= \sqrt{20} \checkmark$$

$$= \sqrt{4}\sqrt{5}$$

$$= 2\sqrt{5} \checkmark$$

4) Express $\frac{\sqrt{40}}{\sqrt{2}}$ as a surd in its simplest form.

$$\frac{\sqrt{40}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$$

$$= \frac{\sqrt{80}}{\sqrt{4}} \quad \checkmark$$

$$= \frac{\sqrt{16}\sqrt{5}}{2}$$

$$= \frac{4\sqrt{5}}{2}$$

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

$$= 2\sqrt{5} \quad \checkmark$$

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4) Express $\frac{\sqrt{40}}{\sqrt{2}}$ as a surd in its simplest form.

$$\frac{\sqrt{40}}{\sqrt{2}}$$

$$= \frac{\sqrt{4}\sqrt{10}}{\sqrt{2}}$$

$$= \frac{2\sqrt{10}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$$

$$= \frac{2\sqrt{20}}{\sqrt{4}}$$

$$= \frac{2\sqrt{20}}{2}$$

$$= \sqrt{20} \checkmark$$

$$= \sqrt{4}\sqrt{5}$$

$$= 2\sqrt{5} \checkmark$$

5)

Simplify $\sqrt{2}(\sqrt{3} + \sqrt{2}) - \sqrt{6}$.

2

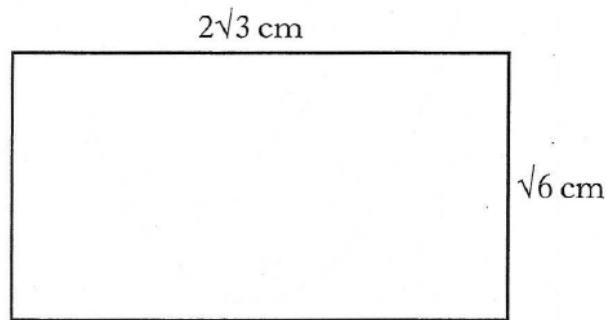
$$\sqrt{2}(\sqrt{3} + \sqrt{2}) - \sqrt{6}$$

$$= \sqrt{6} + \sqrt{4} - \sqrt{6} \quad \checkmark$$

$$= \sqrt{4}$$

$$= \underline{\underline{2}} \quad \checkmark$$

6)



The rectangle above has length $2\sqrt{3}$ centimetres and breadth $\sqrt{6}$ centimetres.

Calculate the area of the rectangle.

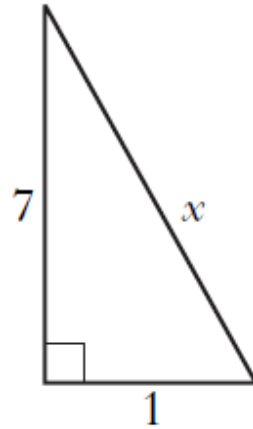
Express your answer as a surd in its simplest form.

3

$$\begin{aligned} A &= L \times B \\ &= 2\sqrt{3} \times \sqrt{6} \checkmark \\ &= 2\sqrt{18} \checkmark \\ &= 2\sqrt{9}\sqrt{2} \\ &= 2 \times 3\sqrt{2} \\ &= 6\sqrt{2} \text{ (cm}^2\text{)} \checkmark \end{aligned}$$

7)

A right-angled triangle is shown below.



$$\begin{aligned}x^2 &= 7^2 + 1^2 \checkmark \\ &= 49 + 1 \\ &= 50 \checkmark\end{aligned}$$

Using Pythagoras' Theorem, find x .

Express your answer as a surd in its simplest form.

$$\begin{aligned}x &= \sqrt{50} \\ &= \sqrt{25} \sqrt{2} \\ &= 5\sqrt{2} \checkmark\end{aligned}$$