



- 1 Write $\sqrt{50}$ in the form $a\sqrt{2}$, where a is an integer.

(1 mark)

$$\sqrt{50} = \sqrt{25 \times 2}$$

$$\sqrt{50} = 5\sqrt{2}$$

$$\boxed{5\sqrt{2}}$$

- 2 Write $\sqrt{6} \times \sqrt{3}$ in the form $a\sqrt{2}$, where a is an integer.

(2 marks)

$$\sqrt{6} \times \sqrt{3} = \sqrt{18}$$

$$\sqrt{18} = \sqrt{9 \times 2}$$

$$\sqrt{18} = 3\sqrt{2}$$

$$\boxed{3\sqrt{2}}$$

- 3 Work out $\sqrt{72} \div \sqrt{2}$.

(2 marks)

$$\sqrt{72} \div \sqrt{2} = \sqrt{\frac{72}{2}}$$

$$= \sqrt{36}$$

$$\boxed{6}$$

- 4 Show that $\sqrt{12} + \sqrt{27}$ can be written as $5\sqrt{3}$.

(2 marks)

$$\sqrt{12} = \sqrt{4 \times 3} = 2\sqrt{3}$$

$$\sqrt{27} = \sqrt{9 \times 3} = 3\sqrt{3}$$

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

$$\boxed{5\sqrt{3}}$$

- 5 Express $\sqrt{80} + \sqrt{45}$ in the form $k\sqrt{5}$, where k is an integer.

(3 marks)

$$\sqrt{80} = \sqrt{(16 \times 5)} = 4\sqrt{5}$$

$$\sqrt{45} = \sqrt{(9 \times 5)} = 3\sqrt{5}$$

$$4\sqrt{5} + 3\sqrt{5} = 7\sqrt{5}, \text{ so } k = 7$$

$$\boxed{7\sqrt{5}}$$

6 Write $8\sqrt{3}$ in the form $\sqrt{n}$, where n is an integer.

(2 marks)

$$\begin{aligned}8 &= \sqrt{64} \\ 8\sqrt{3} &= \sqrt{64} \times \sqrt{3} \\ &= \sqrt{192}\end{aligned}$$

$$\boxed{\sqrt{192}}$$

7 Expand and simplify $(3 + \sqrt{2})(1 + \sqrt{2})$. Give your answer in the form $a + b\sqrt{2}$.

(3 marks)

$$\begin{aligned}(3 + \sqrt{2})(1 + \sqrt{2}) &= 3 + 3\sqrt{2} + \sqrt{2} + 2 \\ &= 5 + 4\sqrt{2}\end{aligned}$$

$$\boxed{5 + 4\sqrt{2}}$$

8 Show that $\sqrt{50} + \frac{18}{\sqrt{2}} = 14\sqrt{2}$

(5 marks)

$$\sqrt{50} = \sqrt{(25 \times 2)} = 5\sqrt{2}$$

Rationalise

$$\frac{18}{\sqrt{2}} = \frac{18\sqrt{2}}{2} = 9\sqrt{2}$$

$$5\sqrt{2} + 9\sqrt{2} = 14\sqrt{2}, \text{ as required}$$

9 A right-angled triangle has hypotenuse 10 cm. One of the other sides is $2\sqrt{7}$ cm.

Work out the length of the third side. Give your answer in the form $k\sqrt{2}$, where k is an integer.

(3 marks)

$$(2\sqrt{7})^2 = 4 \times 7 = 28$$

$$\begin{array}{rcl}x^2 + 28 & = & 10^2 \\ -28 & & \\ \hline x^2 & = & 72 \\ & & \\ x & = & \sqrt{72} \\ & & \\ x & = & \sqrt{36 \times 2}\end{array}$$

$$\boxed{6\sqrt{2} \text{ cm}}$$

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A rectangle has length $2\sqrt{6}$ cm and width $3\sqrt{2}$ cm.

Work out the area of the rectangle. Give your answer in the form $k\sqrt{3}$.

(3 marks)

$$\text{area} = 2\sqrt{6} \times 3\sqrt{2}$$

$$= 6\sqrt{12}$$

$$= 6 \times 2\sqrt{3}$$

$$\boxed{12\sqrt{3} \text{ cm}^2}$$