

- 1 Show that $\frac{\sqrt{8}}{\sqrt{8}-2}$ can be written in the form $n + \sqrt{n}$, where n is an integer.
Show your working clearly.

(3)

- (b) Show that $\frac{\sqrt{20} + \sqrt{80}}{\sqrt{3}}$ can be expressed in the form \sqrt{a} where a is an integer.

Show your working clearly.

(3)

(Total for Question 1 is 6 marks)

- 2 Show that $\frac{2}{6 - 3\sqrt{2}}$ can be written in the form $\frac{a + \sqrt{a}}{b}$
where a and b are integers.
Show your working clearly.

(3)

Given that y is a prime number,

- (b) express $\frac{3}{2 - \sqrt{y}}$ in the form $\frac{a + b\sqrt{y}}{c - y}$ where a , b and c are integers.

(2)

(Total for Question 2 is 5 marks)

3

$$a = \sqrt{8} + 4$$

$$b = \sqrt{8} - 4$$

$(a - b)(a + b)$ can be written in the form $y\sqrt{4y}$

Find the value of y

Show your working clearly.

$y = \dots\dots\dots$

(Total for Question 13 is 3 marks)

- 4 Given that $(8 - \sqrt{x})(5 + \sqrt{x}) = y\sqrt{x} + 21$ where x is a prime number and y is an integer, find the value of x and the value of y . Show each stage of your working clearly.

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

(Total for Question 4 is 3 marks)

- 5** (a) Rationalise the denominator of $\frac{a + \sqrt{4b}}{a - \sqrt{4b}}$ where a is an integer and b is a prime number.

Simplify your answer.

(Total for Question 5 is 3 marks)

6

(a) Show that $(6 + 2\sqrt{12})^2 = 12(7 + 4\sqrt{3})$

Show each stage of your working.

(3)

(b) Without using a calculator, rationalise the denominator of $\frac{6}{3 - \sqrt{7}}$

Simplify your answer.

You must show each stage of your working.

.....
(Total for Question 6 is 6 marks)

7

Show that $\frac{4 + \sqrt{8}}{\sqrt{2} - 1}$ can be written in the form $a + b\sqrt{2}$, where a and b are integers.

Show each stage of your working clearly and give the value of a and the value of b .

(Total for Question 7 is 3 marks)

- 8 Express $\frac{8}{\sqrt{5}-1}$ in the form $\sqrt{a} + b$ where a and b are integers.
Show each stage of your working clearly.

(Total for Question 8 is 3 marks)

9 Show that $\frac{\sqrt{12}}{\sqrt{3} + 2}$

can be written in the form $a + \sqrt{b}$ where a and b are integers.

(Total for Question 9 is 3 marks)

- 10** Without using a calculator, show that $\frac{12}{\sqrt{2}-1} - (\sqrt{2})^5 = 2\sqrt{32} + 12$
Show your working clearly.

(Total for Question 10 is 3 marks)

11 Express $\frac{3 + \sqrt{8}}{(\sqrt{2} - 1)^2}$ in the form $p + \sqrt{q}$ where p and q are integers.

Show each stage of your working clearly.

(Total for Question 11 is 4 marks)

12 Write $\frac{3\sqrt{3}}{4-\sqrt{3}} - \frac{2}{\sqrt{3}}$ in the form $\frac{a\sqrt{3}+b}{c}$ where a , b and c are integers.

.....

(Total for Question 12 is 4 marks)

- 13** (a) Show that $\sqrt{45} + \sqrt{20} = 5\sqrt{5}$
Show your working clearly.

(2)

- (b) Express $\frac{2}{\sqrt{3}-1}$ in the form $p + \sqrt{q}$
where p and q are integers.
Show your working clearly.

.....
(2)

- (c) Express $x^2 + 6\sqrt{2}x - 1$ in the form $(x + a)^2 + b$
Show your working clearly.

.....
(2)

(Total for Question 13 is 6 marks)

14 The area of a rectangle is 18 cm^2

The length of the rectangle is $(\sqrt{7} + 1) \text{ cm}$.

Without using a calculator and showing each stage of your working,

find the width of the rectangle.

Give your answer in the form $a\sqrt{b} + c$ where a , b and c are integers.

..... cm

(Total for Question 14 is 3 marks)

- 15 The diagram shows a cuboid with a square cross section.

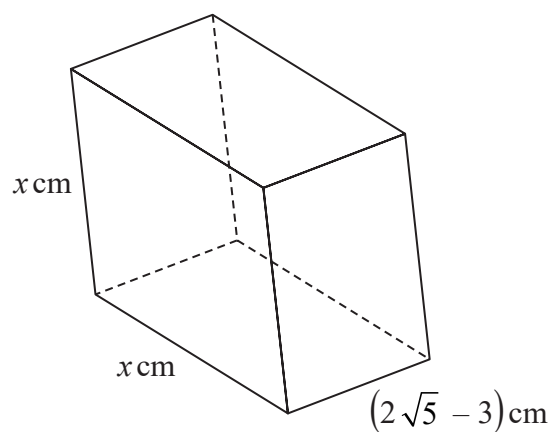


Diagram **NOT**
accurately drawn

The volume of the cuboid is $(13 + 6\sqrt{5})\text{cm}^3$

Without using a calculator, find the value of x

Give your answer in the form $a + \sqrt{b}$ where a and b are integers.

Show your working clearly.

$$x = \dots\dots\dots$$

(Total for Question 15 is 4 marks)
