



THIRD SPACE
LEARNING

GCSE Exam Questions

Surds | Number

GCSE Exam Questions: Surds

1) (a) Simplify $\sqrt{112}$

(1)

(b) Simplify fully: $\frac{3\sqrt{38}}{\sqrt{2}}$

(1)

(c) Simplify fully: $\sqrt{15} \times \sqrt{3}$

(2)
(4 marks)

2) Work out the value of: $(\sqrt{12})^2 \times (\sqrt{5})^2$

(2 marks)

3) Expand and simplify: $(12 - \sqrt{32})(3 + \sqrt{8})$

(3 marks)

GCSE Exam Questions: Surds

- 4) Show that $\sqrt{2}(\sqrt{48} + \sqrt{27})$ can be written in the form $a\sqrt{6}$, where a is an integer to be found.

(2 marks)

- 5) Simplify fully: $\frac{(7 - \sqrt{3})(7 + \sqrt{3})}{\sqrt{92}}$

(4 marks)

- 6) Rationalise the denominator $\frac{5}{\sqrt{12}}$

(2 marks)

- 7) Show that $\frac{9 - \sqrt{24}}{\sqrt{6} + 3}$ can be written as $13 - 5\sqrt{6}$

(3 marks)

GCSE Exam Questions: Surds Answers

	Question	Answer	Marks
1) (a)	Simplify $\sqrt{112}$	$4\sqrt{7}$	(1)
(b)	Simplify fully $\frac{3\sqrt{38}}{\sqrt{2}}$	$3\sqrt{19}$	(1)
(c)	Simplify fully $\sqrt{15} \times \sqrt{3}$	$\sqrt{45}$ $3\sqrt{5}$	(1) (1)
2)	Work out the value of: $(\sqrt{12})^2 \times (\sqrt{5})^2$	$(\sqrt{12})^2 = 12$ or $(\sqrt{5})^2 = 5$ $12 \times 5 = 60$	(1) (1)
3)	Expand and simplify: $(12 - \sqrt{32})(3 + \sqrt{8})$	$(12 - \sqrt{32})(3 + \sqrt{8})$ $= 36 - 3\sqrt{32} + 12\sqrt{8} - 16$ $= 20 - 12\sqrt{2} + 24\sqrt{2}$ $= 20 + 12\sqrt{2}$	(1) (1) (1)
4)	Show that $\sqrt{2}(\sqrt{48} + \sqrt{27})$ can be written in the form $a\sqrt{6}$, where a is an integer to be found.	$\sqrt{48} = 4\sqrt{3}$ or $\sqrt{27} = 3\sqrt{3}$ $\sqrt{2} \times 7\sqrt{3} = 7\sqrt{6}$ or $a = 7$	(1) (1)
5)	Simplify fully: $\frac{(7 - \sqrt{3})(7 + \sqrt{3})}{\sqrt{92}}$	$(7 - \sqrt{3})(7 + \sqrt{3})$ $= 49 + 7\sqrt{3} - 7\sqrt{3} - 3$ $= 46$ $\sqrt{92} = 2\sqrt{23}$ $\frac{46}{2\sqrt{23}} = \frac{46\sqrt{23}}{2 \times 23} = \sqrt{23}$	(1) (1) (1) (1)
6)	Rationalise the denominator $\frac{5}{\sqrt{12}}$	$\sqrt{12} = 2\sqrt{3}$ $\frac{5\sqrt{3}}{6}$	(1) (1)

GCSE Exam Questions: Surds Answers

	Question	Answer	Marks
7)	Show that $\frac{9 - \sqrt{24}}{\sqrt{6} + 3}$ can be written as $13 - 5\sqrt{6}$	$\sqrt{24} = 2\sqrt{6}$ $\frac{(9 - 2\sqrt{6})(\sqrt{6} - 3)}{(\sqrt{6} + 3)(\sqrt{6} - 3)}$ $= \frac{15\sqrt{6} - 39}{-3} = 13 - 5\sqrt{6}$	(1) (1) (1)

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