



THIRD SPACE  
LEARNING

# GCSE Exam Questions

Rationalise the Denominator |  
Number

## GCSE Exam Questions: Rationalise the Denominator

1) Rationalise the denominator:  $\frac{3}{\sqrt{11}}$

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(1 mark)

2) Rationalise the denominator:  $\frac{6}{\sqrt{3}}$

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(2 marks)

3) Rationalise the denominator:  $\frac{5\sqrt{2}}{\sqrt{7}}$

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(2 marks)

4) Simplify fully:  $\frac{\sqrt{6} + 12}{\sqrt{3}}$

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(3 marks)

5) Simplify fully:  $\frac{(3\sqrt{2} + 4)(3\sqrt{2} - 4)}{\sqrt{11}}$

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(3 marks)

6) Rationalise the denominator:  $\frac{10}{\sqrt{7} - 2}$

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(3 marks)

7) Show that  $\frac{12 + \sqrt{45}}{3\sqrt{5} - 6}$  can be written as  $13 + 6\sqrt{5}$ .

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(3 marks)

## GCSE Exam Questions: Rationalise the Denominator

- 8) Show that  $\frac{3\sqrt{10}}{\sqrt{6}} - \frac{2\sqrt{5}}{\sqrt{12}}$  can be written in the form

$\frac{a\sqrt{b}}{3}$ , where  $a$  and  $b$  are integers to be found.

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(5 marks)

## GCSE Exam Questions: Rationalise the Denominator Answers

	Question	Answer	Marks
1)	Rationalise the denominator: $\frac{3}{\sqrt{11}}$	$\frac{3\sqrt{11}}{11}$	(1)
2)	Rationalise the denominator: $\frac{6}{\sqrt{3}}$	$\frac{6\sqrt{3}}{3}$ $2\sqrt{3}$	(1) (1)
3)	Rationalise the denominator: $\frac{5\sqrt{2}}{\sqrt{7}}$	$\frac{5\sqrt{14}}{a}$ or $\frac{5\sqrt{a}}{7}$ $\frac{5\sqrt{14}}{7}$	(1) (1)
4)	Simplify fully: $\frac{\sqrt{6} + 12}{\sqrt{3}}$	$\frac{(\sqrt{6} + 12) \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}}$ $\frac{\sqrt{18} + 12\sqrt{3}}{3}$ $\frac{3\sqrt{2} + 12\sqrt{3}}{3} = \sqrt{2} + 4\sqrt{3}$	(1) (1) (1)
5)	Simplify fully $\frac{(3\sqrt{2} + 4)(3\sqrt{2} - 4)}{\sqrt{11}}$	$(3\sqrt{2} + 4)(3\sqrt{2} - 4)$ $= 18 + 12\sqrt{2} - 12\sqrt{2} - 16$ At least 2 terms correct All 4 terms correct $\frac{2}{\sqrt{11}} = \frac{2\sqrt{11}}{11}$	(1) (1) (1)
6)	Rationalise the denominator: $\frac{10}{\sqrt{7} - 2}$	$\frac{10 \times (\sqrt{7} + 2)}{(\sqrt{7} - 2)(\sqrt{7} + 2)}$ Denominator = 3 $\frac{10\sqrt{7} + 20}{3}$	(1) (1) (1)

## GCSE Exam Questions: Rationalise the Denominator Answers

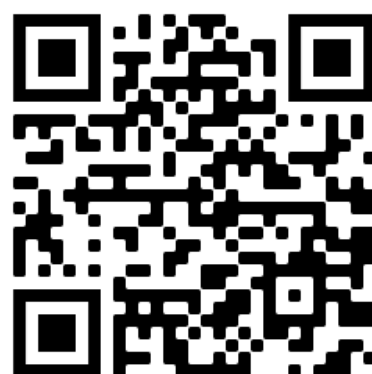
	Question	Answer	Marks
7)	<p>Show that <math>\frac{12 + \sqrt{45}}{3\sqrt{5} - 6}</math> can be written as</p> <p><math>13 + 6\sqrt{5}</math>.</p>	$\sqrt{45} = 3\sqrt{5}$ $\frac{(12 + 3\sqrt{5})(3\sqrt{5} + 6)}{(3\sqrt{5} - 6)(3\sqrt{5} + 6)}$ $\left( = \frac{36\sqrt{5} + 45 + 72 + 18\sqrt{5}}{9} \right)$ $\frac{117 + 54\sqrt{5}}{9} = 13 + 6\sqrt{5}$	<p>(1)</p> <p>(1)</p> <p>(1)</p>
8)	<p>Show that <math>\frac{3\sqrt{10}}{\sqrt{6}} - \frac{2\sqrt{5}}{\sqrt{12}}</math> can be written in</p> <p>the form <math>\frac{a\sqrt{b}}{3}</math>, where <math>a</math> and <math>b</math> are integers to be found.</p>	<p>Common denominator of <math>\sqrt{12}</math></p> $\frac{3\sqrt{10} \times \sqrt{2}}{\sqrt{6} \times \sqrt{2}} = \frac{3\sqrt{20}}{\sqrt{12}} \left( = \frac{6\sqrt{5}}{\sqrt{12}} \right)$ $\frac{6\sqrt{5}}{\sqrt{12}} - \frac{2\sqrt{5}}{\sqrt{12}} = \frac{4\sqrt{5}}{\sqrt{12}} \left( = \frac{4\sqrt{5}}{2\sqrt{3}} \right)$ $\frac{4\sqrt{5} \times \sqrt{3}}{2\sqrt{3} \times \sqrt{3}}$ <p>or correct attempt at rationalising their denominator</p> $\frac{2\sqrt{15}}{3} \text{ or } a = 2, b = 15 \text{ seen}$	<p>(1)</p> <p>(1)</p> <p>(1)</p> <p>(1)</p> <p>(1)</p>

# Where to go next?

For more diagnostic questions, and GCSE maths revision resources and worksheets to support students in fixing any misconceptions take a look at the free Third Space Learning [GCSE maths revision](#) pages.

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