Name:

Level 2 Further Maths

Rationalising Denominators

Corbettmaths

Ensure you have: Pencil or pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Revision for this topic

www.corbettmaths.com/more/further-maths/

1. Rationalise the denominator and simplify fully $\dfrac{9}{\sqrt{10}+3}$

$$\frac{9(\sqrt{10}-3)}{(\sqrt{10}+3)(\sqrt{10}-3)} = \frac{9\sqrt{10}-27}{10-3\sqrt{10}+3\sqrt{10}-9}$$

$$= \frac{9\sqrt{10}-27}{1}$$

$9\sqrt{10}-27$

(3)

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2. Rationalise the denominator of $\dfrac{33}{4-\sqrt{5}}$

Give your answer in the form $a+b\sqrt{5}$ where a and b are integers.

$$\frac{33(4+\sqrt{5})}{(4-\sqrt{5})(4+\sqrt{5})}$$

$$= \frac{132+33\sqrt{5}}{16+4\sqrt{5}-4\sqrt{5}-5}$$

$$= \frac{132+33\sqrt{5}}{11}$$

$12+3\sqrt{5}$

(3)

3. Rationalise and simplify $\dfrac{\sqrt{5}-7}{\sqrt{5}+1}$

Give your answer in the form $a+b\sqrt{5}$ where a and b are integers.

$$\frac{(\sqrt{5}-7)(\sqrt{5}-1)}{(\sqrt{5}+1)(\sqrt{5}-1)} = \frac{5-\sqrt{5}-7\sqrt{5}+7}{4}$$

$$= \frac{12-8\sqrt{5}}{4}$$

$3-2\sqrt{5}$

.....

(4)

4. Rationalise and simplify $\dfrac{18-\sqrt{6}}{3-\sqrt{6}}$

Give your answer in the form $a+b\sqrt{6}$ where a and b are integers.

$$\frac{(18-\sqrt{6})(3+\sqrt{6})}{(3-\sqrt{6})(3+\sqrt{6})} = \frac{54+18\sqrt{6}-3\sqrt{6}-6}{3}$$

$$= \frac{48+15\sqrt{6}}{3}$$

$16+5\sqrt{6}$

.....

(4)

5. Simplify fully $\dfrac{20-\sqrt{50}}{3\sqrt{2}-5}$

Give your answer in the form $a+b\sqrt{2}$ where a and b are integers.

$$\frac{(20-\sqrt{50})(3\sqrt{2}+5)}{(3\sqrt{2}-5)(3\sqrt{2}+5)} = \frac{60\sqrt{2}+100-3\sqrt{100}-5\sqrt{50}}{-7}$$

$$= \frac{60\sqrt{2}+100-30-25\sqrt{2}}{-7}$$

$$= \frac{35\sqrt{2}+70}{-7}$$

$$-5\sqrt{2}-10$$

.....

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6. Write $\dfrac{6\sqrt{12}}{3-\sqrt{5}}$ in the form $\sqrt{x}+\sqrt{y}$ where x and y are integers.

$$\frac{6\sqrt{12}(3+\sqrt{5})}{(3-\sqrt{5})(3+\sqrt{5})} = \frac{18\sqrt{12}+6\sqrt{60}}{4}$$

$$= \frac{36\sqrt{3}+12\sqrt{15}}{4}$$

$$= 9\sqrt{3}+3\sqrt{15}$$

$$= \sqrt{243}+\sqrt{135}$$

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(5)

7. Rationalise and simplify $\dfrac{17\sqrt{3}+5\sqrt{5}}{2\sqrt{3}-\sqrt{5}}$

$$= \frac{(17\sqrt{3}+5\sqrt{5})(2\sqrt{3}+\sqrt{5})}{(2\sqrt{3}-\sqrt{5})(2\sqrt{3}+\sqrt{5})}$$

$$= \frac{34\times 3 + 17\sqrt{15} + 10\sqrt{15} + 5\times 5}{4\times 3 + 2\sqrt{15} - 2\sqrt{15} - 5}$$

$$= \frac{102 + 27\sqrt{15} + 25}{7}$$

$$= \frac{127 + 27\sqrt{15}}{7}$$

$\frac{127}{7} + \frac{27}{7}\sqrt{15}$

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