AQA, OCR, Edexcel

GCSE

GCSE Maths

Surds Answers

Name:

M M E

Mathsmadeeasy.co.uk

Total Marks: /35

Surds (non-calculator)

1. What Is a Surd?
   - A surd is a square root that cannot be reduced to a whole number.

(1 mark)

2. Simplify the following quantities:
   i. $(\sqrt{5})2$ $= 5$
   ii. $\sqrt{7} \times \sqrt{7}$ $= 7$
   iii. $\sqrt{11}^2$ $= 11$
   iv. $\sqrt{8} \times \sqrt{2}$ $= 4$
   v. $\sqrt{18} \times \sqrt{2}$ $= 6$

(5 Marks)

3. Show that $\sqrt{45} = 3\sqrt{5}$ $\sqrt{45} = \sqrt{9 \times 5} = \sqrt{9} \times \sqrt{5} = 3\sqrt{5}$

(2 marks)

4. Show that $\sqrt{32} = 4\sqrt{2}$ $\sqrt{32} = \sqrt{16 \times 2} = \sqrt{16} \times \sqrt{2} = 4\sqrt{2}$

(2 Marks)

5. Given that $2\sqrt{x} = 16$, find x. $x = 64$

(2 marks)

6. Given that $x(\sqrt{32} \times \sqrt{32}) = 64$, find x. $x = 2$

(3 Marks)

7. Simplify the following expressions:

a) $3\sqrt{2}\ x\ 3\sqrt{2}$ $= 9\sqrt{4} = 18$

b) $\sqrt{45} + \sqrt{45}$ $= 6\sqrt{5}$

c) $2\left(2\sqrt{2} \times 2\sqrt{2}\right)$ $= 16$

d) $4\sqrt{3} - 3\sqrt{3}$ $= \sqrt{3}$

(4 Marks)

8. Evaluate the following:

a) 3^{-2} $= \frac{1}{9}$

b) 4^0 $= 1$

c) $4^{\frac{1}{2}}$ $= 2$

d) $\sqrt{144}$ $= 12$

(4 Marks)

9. Expand and simplify the following:

a) $(3 + 5\sqrt{6})(4 + 4\sqrt{8})$ $= 12 + 24\sqrt{2} + 80\sqrt{3} + 20\sqrt{6}$

b) $(4 + 5\sqrt{12})(7 + 4\sqrt{6})$ $= 28 + 120\sqrt{2} + 70\sqrt{3} + 16\sqrt{6}$

c) $(2 + 3\sqrt{4})(6 + 5\sqrt{3})$ $= 48 + 40\sqrt{3}$

(5 marks)

10. Rationalise the denominator and simplify (Hard):

a) $\frac{3}{\sqrt{6}+3}$ $= 3 - \sqrt{6}$

b) $\frac{10}{\sqrt{7}-6}$ $= -\frac{10}{29}(6 + \sqrt{7})$

c) $\frac{12}{\sqrt{20}-7}$ $= -\frac{12}{29}(7 + 2\sqrt{5})$

(5 Marks)

11. Rationalise the denominator and simplify (very hard):

a) $\frac{3+\sqrt{2}}{\sqrt{6}+3}$ $= \frac{9-3\sqrt{6}+3\sqrt{2}-\sqrt{6\times 2}}{3} = \frac{1}{3}(3-\sqrt{6})(3+\sqrt{2})$

(2 Marks)