Name:

Exam Style Questions

# Surds

Corbettmaths

Equipment needed: Pen

**Guidance**

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

Video Tutorial

www.corbettmaths.com/contents

Videos 305, 306, 307, 308

Answers and Video Solutions

1. Evaluate the following

(a) $\sqrt{3} \times \sqrt{7}$

.....

**(1)**

(b) $\sqrt{24} \div \sqrt{6}$

.....

**(2)**

(c) $2\sqrt{3} \times 3\sqrt{5}$

.....

**(2)**

(d) $10\sqrt{8} \div 2\sqrt{2}$

.....

**(2)**

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2. Simplify $\left(\sqrt{3}\right)^2$

.....

**(1)**

3. Work out the exact value of $\left(\sqrt{2}\right)^4$

.....

**(1)**

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4. (a) Express $\sqrt{75}$ in its simplest form.

.....

**(1)**

(b) Express $\sqrt{32}$ in its simplest form.

.....

**(1)**

(c) Express $\sqrt{8}$ in its simplest form.

.....

**(1)**

(d) Express $\sqrt{200}$ in its simplest form.

.....

**(1)**

5. Simplify $\sqrt{5} \times \sqrt{10}$

.....

**(2)**

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6. Simplify fully

(a) $\sqrt{50} + \sqrt{32}$

.....

**(2)**

(b) $\sqrt{80} + \sqrt{20}$

.....

**(2)**

(c) $\sqrt{200} - \sqrt{72}$

.....

**(2)**

(d) $3\sqrt{12} + \sqrt{75}$

.....

**(3)**

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7. Tilly has been asked to work out $\sqrt{2} + \sqrt{8}$

Tilly says the answer is $\sqrt{10}$ as 2 + 8 = 10

Is Tilly correct?
Explain your answer.

.....

.....

.....

**(2)**

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8. Express $\sqrt{2} + \sqrt{98}$ in the form $a\sqrt{2}$ where a is an integer.

.....

**(2)**

9. Write $\sqrt{150} + \sqrt{24}$ in the form $k\sqrt{6}$

.....

**(2)**

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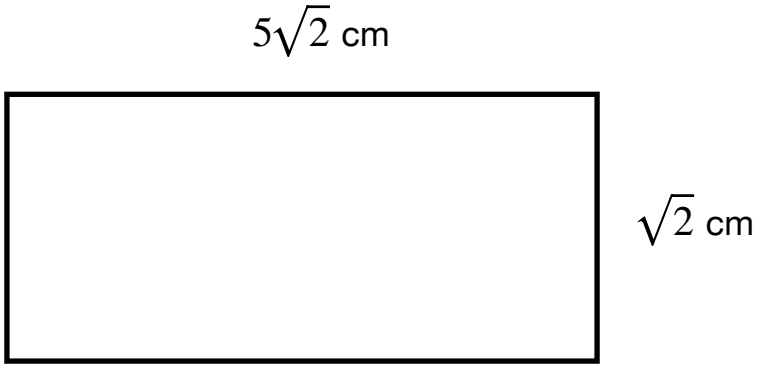
10. Shown below is a rectangle.




(a) Find the perimeter of the rectangle.

.....cm

**(2)**

(b) Find the area of the rectangle.

.....cm²

**(2)**

11. Write each of these in the form $a\sqrt{3}$ , where a is an integer.

(a) $\sqrt{6} \times \sqrt{8}$

.....

**(2)**

(b) $\sqrt{27} + \sqrt{75}$

.....

**(2)**

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12. Rationalise the denominator of $\dfrac{15}{\sqrt{5}}$

.....

**(2)**

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13. Simplify fully $\sqrt{600} + \sqrt{24}$

.....

**(2)**

14. (a) Rationalise the denominator of $\frac{12}{\sqrt{3}}$

.....

**(2)**

(b) Evaluate $\sqrt{2} \times \sqrt{32}$

.....

**(2)**

(c) Expand and simplify $\left(\sqrt{3} + \sqrt{5}\right)^2$

.....

**(2)**

(d) Evaluate $\left(5 + \sqrt{2}\right)\left(5 - \sqrt{2}\right)$

.....

**(2)**

15. (a) Simplify fully $\sqrt{3}\left(\sqrt{27}-\sqrt{3}\right)$

.....

**(2)**

(b) Given that $a = \sqrt{2}$ $b = \sqrt{15}$ $c = \sqrt{30}$

work out the value of

$$\frac{b}{ac}$$

write your answer in its simplest form

.....

**(3)**

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16. Rationalise the denominator of

$$\frac{12}{7\sqrt{3}}$$

.....

**(2)**

17. Given that a = $\sqrt{3}$ and b = $\sqrt{48}$

(a) find the value of $a^2$

.....

**(1)**

(b) show that $(a+b)^2 = 75$

.....

**(3)**

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18. Expand and simplify $(3+\sqrt{8})(4+\sqrt{2})$

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

.....

**(4)**

19. Simplify $5\sqrt{8} + \sqrt{18}$

.....

**(2)**

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20. Rationalise the denominator of

$$\frac{8}{\sqrt{2}}$$

.....

**(2)**

---

21. Expand and simplify $\left(\sqrt{7} - \sqrt{3}\right)^2$

.....

**(2)**

22. Write $\sqrt{11}+\sqrt{99}$ in the form $a\sqrt{b}$ where a and b are integers.

.....

**(2)**

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23. Expand $\left(8-\sqrt{3}\right)^2$ giving your answer in form $a+b\sqrt{3}$

.....

**(2)**

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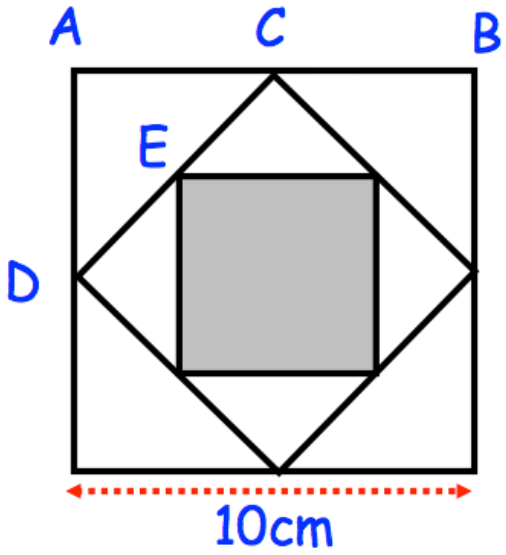
24. Show that $\left(\sqrt{2}+3\sqrt{8}\right)^2=98$

.....

**(3)**

25. The midpoints of the sides of a square of side 10cm are joined to form another square.
This process is then repeated to create the shaded square.




Find the area of the shaded square.

.....cm²

**(4)**

26. Simplify $\sqrt{80} - \frac{10}{\sqrt{5}}$

.....

**(3)**

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27. Given that

$$\frac{10 - \sqrt{32}}{\sqrt{2}} = a + b\sqrt{2}$$

where a and b are integer.

Find the values of a and b.

a = .....

b = .....

**(4)**

28. A shed has dimensions, in metres, of

Height = $\sqrt{5}$ Width = $\sqrt{6}$ Length = $\frac{9}{\sqrt{2}}$

Find the volume of the shed.
Give your answer in the form $a\sqrt{15}$ , where a is an integer.

.....m³

**(3)**

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29. (a) Simplify $\sqrt{2}\,y + \sqrt{2}\,y + \sqrt{2}\,y$

.....

**(1)**

(b) Simplify fully $\sqrt{2}\,y \times \sqrt{2}\,y \times \sqrt{2}\,y$

.....

**(2)**

30. $c = \dfrac{9}{2\sqrt{y}}$ $d = \dfrac{4}{\sqrt{y}}$

Work out $cd$

.....

**(3)**

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31. $y = \dfrac{4\sqrt{10}}{5}$

Work out the value of $y^3$

.....

**(3)**

32. $\left(3+c\sqrt{5}\right)^2 = d + 24\sqrt{5}$

Work out the values of c and d.

c = .....

d = .....

**(4)**

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33. $\sqrt{300} - 2\sqrt{x} = 4\sqrt{3}$

Work out the value of $x$

.....

**(3)**

34. Given that

$$\sqrt{1\frac{2}{25}} + \sqrt{12} = \frac{a\sqrt{3}}{b}$$

Work out the values of $a$ and $b$

.....

**(3)**

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35. Write

$$\frac{4}{\sqrt{5}} - \sqrt{2\frac{2}{9}}$$ in the form $a\sqrt{5}$

.....

**(4)**

36. Write $\dfrac{6}{\frac{1}{\sqrt{2}}+\sqrt{2}}$ in the form $a\sqrt{2}$

.....

**(4)**

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37. Show that $\dfrac{16}{\sqrt{11}-3}$ can be written in the form $a+b\sqrt{11}$

.....

**(4)**

38. Show that $\frac{6}{2-\sqrt{3}}$ can be written in the form $a+b\sqrt{3}$

.....

**(4)**

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39. Write $\frac{4\sqrt{2}}{3+\sqrt{2}}+\frac{6}{\sqrt{2}}$ in the form $\frac{a\sqrt{2}-b}{c}$

.....

**(4)**

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

.....

**(4)**