JRA Tutors
Private tuition and small online Study Pods

Surds

Grade 7 topic · Higher tier · Edexcel and AQA

How to use this pack
20 questions that get harder as you go. Questions 1–15 (45 marks) build up to the harder Grade 8–9 style questions at the end; aim to complete all 20. Show your working on the lines and write your final answer on the answer line, then mark yourself with the answers at the back. Diagrams are not drawn accurately. Total: 69 marks.

Warm-up

1 Write $\sqrt{98}$ in the form $a\sqrt{b}$, where a and b are integers and b is as small as possible. **[2 marks]**

Answer _____

2 Write $\sqrt{24}$ in the form $a\sqrt{b}$, where a and b are integers and b is as small as possible. **[2 marks]**

Answer _____

3 Write $\sqrt{27}$ in the form $a\sqrt{b}$, where a and b are integers and b is as small as possible. **[2 marks]**

Answer _____

4 Write $\sqrt{20}$ in the form $a\sqrt{b}$, where a and b are integers and b is as small as possible. **[2 marks]**

Answer _____

5 Write $\sqrt{125}$ in the form $a\sqrt{b}$, where a and b are integers and b is as small as possible. **[2 marks]**

Answer _____

Core

6 Work out $\sqrt{7} \times \sqrt{175}$. **[3 marks]**

Answer _____

7 Work out $(4\sqrt{6})^2$. **[3 marks]**

Answer _____

8 Simplify $\sqrt{96} + \sqrt{24}$. **[3 marks]**

Answer _____

9 Work out $3\sqrt{2} \times 3\sqrt{2}$. **[3 marks]**

Answer _____

10 Expand and simplify $(5 + \sqrt{2})(5 - \sqrt{2})$. **[3 marks]**

Answer _____

Stretch

11 Rationalise the denominator of $1/\sqrt{7}$. **[4 marks]**

Answer _____

12 Rationalise the denominator of $20/\sqrt{5}$. **[4 marks]**

Answer _____

13 Expand and simplify $(2 + \sqrt{2})^2$. **[4 marks]**

Answer _____

14 Expand and simplify $(4 + \sqrt{6})(9 - \sqrt{6})$. **[4 marks]**

Answer _____

15 Expand and simplify $\sqrt{10}(\sqrt{10} + 5)$. **[4 marks]**

Answer _____

Challenge

16 Rationalise the denominator of $34/(6 + \sqrt{2})$. Give your answer in the form $a - b\sqrt{c}$. **[5 marks]**

Answer _____

17 Expand and simplify $(4\sqrt{10} + 3)^2$. **[5 marks]**

Answer _____

18 Solve $x^2 = 20$. Give your answers in the form $\pm a\sqrt{b}$. **[4 marks]**

Answer _____

19 A right-angled triangle has shorter sides 4 cm and 6 cm. Work out the exact length of the hypotenuse, in the form $a\sqrt{b}$. **[5 marks]**

Answer _____

20 Write $\frac{1}{(1 + \sqrt{10})} - \frac{1}{(1 - \sqrt{10})}$ in the form $\frac{a\sqrt{10}}{b}$, where a and b are integers. **[5 marks]**

Answer _____