



Surds Exam Practice

- Q1. Simplify the following expression showing all your steps:
 $\sqrt{200} - \sqrt{32}$
(2 marks)
- Q2. Write $8\sqrt{75}$ in the form $k\sqrt{3}$ where k is an integer to be found. You must show your working out.
(2 marks)
- Q3. Simplify the following expression, showing all your working out.
$$\frac{3\sqrt{7} - 5\sqrt{7} - 6\sqrt{28}}{7}$$

(3 marks)
- Q4. Rationalise the denominator of each of the following expressions, and give your answer in its most simplified form:
- a) $\frac{27}{3\sqrt{13}}$
(2 marks)
- b) $\frac{\sqrt{6} - \sqrt{5}}{\sqrt{6} + \sqrt{5}}$
(3 marks)
- Q5. Express $\sqrt{32} - \frac{14}{\sqrt{2}}$ in the form $k\sqrt{2}$ where k is an integer.
(2 marks)
- Q6. Show that the following expression: $\frac{1}{\frac{3}{\sqrt{2}} + \sqrt{2}} - \frac{\sqrt{2}}{5}$ is equal to 0.
(3 marks)
- Q7. Rationalise the denominator and simplify the following expression:
 $\frac{b + \sqrt{c}}{b - \sqrt{c}}$ where b and c are integers.
(4 marks)
- Q8. Let a be a positive integer. Simplify the following expression:
 $\sqrt{a}\sqrt{a} - (\sqrt{a} + a)^2$
(2 marks)
- Q9. Let c and d be any positive integers. Express $c\sqrt{d}$ in the form \sqrt{E} , where E is an expression in terms of c and d .
(1 mark)



Applied Mixed Practice Problems

Q10. One cube has side length $3\sqrt{10}$, whilst another cube has side length $4\sqrt{5}$.

Work out the ratio of the volume of the smaller cube to the larger cube, simplifying your answer.

(4 marks)

Q11. A cathedral is $2\sqrt{3}$ miles due South and $\sqrt{12} - 4$ due West of a railway station. Show that the exact distance of the railway station to the cathedral can be expressed in the form $a(b - c\sqrt{3})$, where a , b and c are integers.

(3 marks)

Q12. (i) Suppose that a and b are positive integers and $a > b$. Write down an inequality relating a^2 and b^2 .

(1 mark)

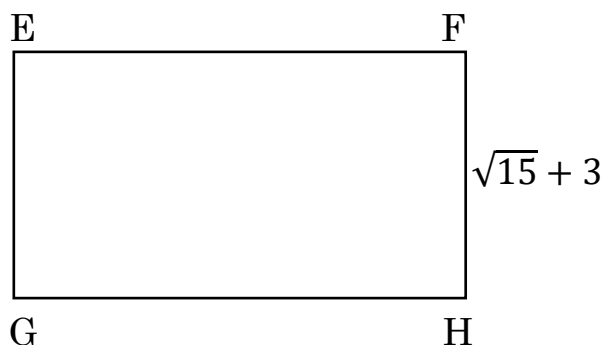
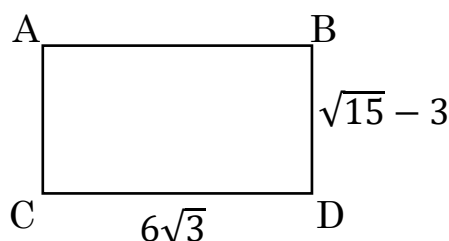
(ii) Hence or otherwise, prove, using algebra, that $\sqrt{3} + \sqrt{7} > \sqrt{10}$.

(3 marks)

Q13. Show that $3^{\frac{3}{2}} - 27(3^{-\frac{1}{2}})$ can be written in the form $k\sqrt{3}$ for some integer k .

(3 marks)

Q14. ABCD and EFGH are similar shapes. Find the length of side GH, giving your answer in the form $a + \sqrt{b}$.



(4 marks)