

MEI Core 1 Surds Questions Jan 05 - May 09

1 Simplify $(3 + \sqrt{2})(3 - \sqrt{2})$.

Express $\frac{1 + \sqrt{2}}{3 - \sqrt{2}}$ in the form $a + b\sqrt{2}$, where a and b are rational. [5]

2 (i) Simplify $\sqrt{24} + \sqrt{6}$. [2]

(ii) Express $\frac{36}{5 - \sqrt{7}}$ in the form $a + b\sqrt{7}$, where a and b are integers. [3]

3 (i) Simplify $5\sqrt{8} + 4\sqrt{50}$. Express your answer in the form $a\sqrt{b}$, where a and b are integers and b is as small as possible. [2]

(ii) Express $\frac{\sqrt{3}}{6 - \sqrt{3}}$ in the form $p + q\sqrt{3}$, where p and q are rational. [3]

4 (i) Simplify $6\sqrt{2} \times 5\sqrt{3} - \sqrt{24}$. [2]

(ii) Express $(2 - 3\sqrt{5})^2$ in the form $a + b\sqrt{5}$, where a and b are integers. [3]

5 You are given that $a = \frac{3}{2}$, $b = \frac{9 - \sqrt{17}}{4}$ and $c = \frac{9 + \sqrt{17}}{4}$. Show that $a + b + c = abc$. [4]

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6 (i) Simplify $\sqrt{98} - \sqrt{50}$. [2]

(ii) Express $\frac{6\sqrt{5}}{2+\sqrt{5}}$ in the form $a + b\sqrt{5}$, where a and b are integers. [3]

7 (i) Write $\sqrt{48} + \sqrt{3}$ in the form $a\sqrt{b}$, where a and b are integers and b is as small as possible. [2]

(ii) Simplify $\frac{1}{5+\sqrt{2}} + \frac{1}{5-\sqrt{2}}$. [3]

8 (i) Express $\frac{1}{5+\sqrt{3}}$ in the form $\frac{a+b\sqrt{3}}{c}$, where a , b and c are integers. [2]

(ii) Expand and simplify $(3 - 2\sqrt{7})^2$. [3]

9 (i) Express $\sqrt{75} + \sqrt{48}$ in the form $a\sqrt{3}$. [2]

(ii) Express $\frac{14}{3-\sqrt{2}}$ in the form $b + c\sqrt{d}$. [3]

10 (i) Simplify $\frac{\sqrt{48}}{2\sqrt{27}}$. [2]

(ii) Expand and simplify $(5 - 3\sqrt{2})^2$. [3]