Surds

1. Find the value of k in each of these

|  |  |  |  |
| --- | --- | --- | --- |
| a)$\sqrt{8}=k\sqrt{2}$ | b)$ \sqrt{50}=k\sqrt{2}$ | c)$ \sqrt{98}=k\sqrt{2}$ | d)$ \sqrt{12}=k\sqrt{3}$ |
| e)$ \sqrt{300}=k\sqrt{3}$ | f)$ \sqrt{45}=k\sqrt{5}$ | g)$ \sqrt{125}=k\sqrt{5}$ | h)$ \sqrt{28}=k\sqrt{7}$ |

2. Simplify fully, write each in the form $k\sqrt{m}$ where k and m are both integers.

|  |  |  |  |
| --- | --- | --- | --- |
| a)$ \sqrt{20}$ | b)$ \sqrt{18}$ | c)$ \sqrt{32}$ | d)$ \sqrt{72}$ |
| e)$ \sqrt{162}$ | f)$ \sqrt{147}$ | g)$ \sqrt{256}$ | h)$ \sqrt{288}$ |

3. Write these as a single surd then evaluate

|  |  |  |  |
| --- | --- | --- | --- |
| a)$ \sqrt{20}×\sqrt{5}$ | b)$ \sqrt{16}×\sqrt{4}$ | c)$ \sqrt{27}×\sqrt{3}$ | d)$ \sqrt{200}×\sqrt{2}$ |
| e)$ \sqrt{24}×\sqrt{6}$ | f)$ \sqrt{28}×\sqrt{7}$ | g)$ \sqrt{6}×\sqrt{8}×\sqrt{3}$ | h)$ \sqrt{5}×\sqrt{10}×\sqrt{2}$ |

4. Evaluate

|  |  |  |  |
| --- | --- | --- | --- |
| a)$ 2\sqrt{20}×3\sqrt{5}$ | b)$ 4\sqrt{27}×6\sqrt{3}$ | c)$ 5\sqrt{24}×2\sqrt{6}$ | d)$ 3\sqrt{6}×2\sqrt{8}×4\sqrt{3}$ |

5. Write as a single surd then evaluate

|  |  |  |  |
| --- | --- | --- | --- |
| a)$ \frac{\sqrt{50}}{\sqrt{2}}$ | b)$ \frac{\sqrt{90}}{\sqrt{10}}$ | c)$ \frac{\sqrt{320}}{\sqrt{5}}$ | d)$ \frac{\sqrt{1000}}{\sqrt{10}}$ |
| e)$ \frac{\sqrt{32}×\sqrt{4}}{\sqrt{2}}$ | f)$ \frac{\sqrt{35}×\sqrt{5}}{\sqrt{7}}$ | g)$ \frac{\sqrt{48}×\sqrt{8}}{\sqrt{6}}$ | h)$ \frac{\sqrt{30}×\sqrt{12}}{\sqrt{2}×\sqrt{5}}$ |

6. Evaluate

|  |  |  |  |
| --- | --- | --- | --- |
| a)$ \frac{8\sqrt{75}}{\sqrt{5}}$ | b)$ \frac{6\sqrt{160}}{3\sqrt{10}}$ | c)$ \frac{2\sqrt{320}}{4\sqrt{5}}$ | d)$ \frac{4\sqrt{72}×3\sqrt{4}}{12\sqrt{2}}$ |

7. Expand & Simplify

|  |  |  |  |
| --- | --- | --- | --- |
| a)$ \left(5+\sqrt{3}\right)\left(6+\sqrt{3}\right)$ | b)$ \left(4+\sqrt{2}\right)\left(5-\sqrt{2}\right)$ | c)$ \left(7+\sqrt{5}\right)\left(7-\sqrt{5}\right)$ | d)$ \left(2+\sqrt{3}\right)\left(2+\sqrt{3}\right)$ |
| e)$ \left(1+2\sqrt{5}\right)\left(6+\sqrt{5}\right)$ | f)$ \left(7-\sqrt{2}\right)\left(4-3\sqrt{2}\right)$ | g)$ \left(2+\sqrt{2}\right)\left(5-\sqrt{8}\right)$ | h)$ \left(6+3\sqrt{3}\right)\left(6-3\sqrt{3}\right)$ |

8. Rationalise the denominators

|  |  |  |  |
| --- | --- | --- | --- |
| a)$ \frac{5}{\sqrt{2}}$ | b)$ \frac{8}{\sqrt{2}}$ | c)$ \frac{9}{\sqrt{3}}$ | d)$ \frac{5}{\sqrt{5}}$ |
| e)$ \frac{1}{1+\sqrt{2}}$ | f)$ \frac{8}{2-\sqrt{5}}$ | g)$ \frac{3+\sqrt{2}}{3-\sqrt{2}}$ | h)$ \frac{6-\sqrt{5}}{6+\sqrt{}5}$ |