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Surds Revision

1. Express in its simplest surd form:

(a) $\sqrt{45} + \sqrt{20}$ (b) $\sqrt{8} + \sqrt{2}$ (c) $\sqrt{12} + \sqrt{27}$ (d) $\sqrt{50} - \sqrt{18}$

(e) $\sqrt{28} + \sqrt{7}$ (f) $\sqrt{50} + \sqrt{8}$ (g) $\sqrt{18} + \sqrt{8}$ (h) $\sqrt{75} - \sqrt{12}$

(i) $\sqrt{24} + \sqrt{6}$ (j) $\sqrt{250} - \sqrt{40}$ (k) $\sqrt{63} + \sqrt{28}$ (l) $\sqrt{32} + \sqrt{8}$

2. Use the rule $\sqrt{a} \times \sqrt{b} = \sqrt{ab}$ to simplify the following.

(a) $\sqrt{2} \times \sqrt{6}$ (b) $\sqrt{10} \times \sqrt{2}$ (c) $\sqrt{6} \times \sqrt{3}$ (d) $\sqrt{8} \times \sqrt{5}$

(e) $\sqrt{5} \times \sqrt{10}$ (f) $\sqrt{3} \times \sqrt{8}$ (g) $\sqrt{20} \times \sqrt{2}$ (h) $\sqrt{3} \times \sqrt{33}$

(i) $\sqrt{20} \times \sqrt{10}$ (j) $\sqrt{15} \times \sqrt{3}$ (k) $\sqrt{10} \times \sqrt{50}$ (l) $\sqrt{12} \times \sqrt{6}$

3. Use the rule $\dfrac{\sqrt{a}}{\sqrt{b}} = \sqrt{\dfrac{a}{b}}$ to simplify the following.

(a) $\dfrac{\sqrt{24}}{\sqrt{3}}$ (b) $\dfrac{\sqrt{60}}{\sqrt{5}}$ (c) $\dfrac{\sqrt{90}}{\sqrt{2}}$ (d) $\dfrac{\sqrt{60}}{\sqrt{3}}$ (e) $\dfrac{\sqrt{40}}{\sqrt{5}}$ (f) $\dfrac{\sqrt{80}}{\sqrt{2}}$

4. Express each fraction with a rational denominator and simplify where possible:

(a) $\dfrac{1}{\sqrt{5}}$ (b) $\dfrac{2}{\sqrt{7}}$ (c) $\dfrac{5}{\sqrt{10}}$ (d) $\dfrac{2}{\sqrt{6}}$ (e) $\dfrac{8}{\sqrt{10}}$ (f) $\dfrac{6}{\sqrt{15}}$

(g) $\dfrac{3}{\sqrt{6}}$ (h) $\dfrac{10}{\sqrt{2}}$ (i) $\dfrac{4}{\sqrt{6}}$ (j) $\dfrac{12}{\sqrt{3}}$ (k) $\dfrac{70}{\sqrt{7}}$ (l) $\dfrac{9}{\sqrt{6}}$

Answers

1. (a) $5\sqrt{5}$ (b) $3\sqrt{2}$ (c) $5\sqrt{3}$ (d) $2\sqrt{2}$ (e) $3\sqrt{7}$ (f) $7\sqrt{2}$
(g) $5\sqrt{2}$ (h) $3\sqrt{3}$ (i) $3\sqrt{6}$ (j) $3\sqrt{10}$ (k) $5\sqrt{7}$ (l) $6\sqrt{2}$

2. (a) $2\sqrt{3}$ (b) $2\sqrt{5}$ (c) $3\sqrt{2}$ (d) $2\sqrt{10}$ (e) $5\sqrt{2}$ (f) $2\sqrt{6}$
(g) $2\sqrt{10}$ (h) $3\sqrt{11}$ (i) $10\sqrt{2}$ (j) $3\sqrt{5}$ (k) $10\sqrt{5}$ (l) $6\sqrt{2}$

3. (a) $2\sqrt{2}$ (b) $2\sqrt{3}$ (c) $3\sqrt{5}$ (d) $2\sqrt{5}$ (e) $2\sqrt{2}$ (f) $2\sqrt{10}$

4. (a) $\frac{\sqrt{5}}{5}$ (b) $\frac{2\sqrt{7}}{7}$ (c) $\frac{\sqrt{10}}{2}$ (d) $\frac{\sqrt{6}}{3}$ (e) $\frac{4\sqrt{10}}{5}$ (f) $\frac{2\sqrt{15}}{5}$
(g) $\frac{\sqrt{6}}{2}$ (h) $5\sqrt{2}$ (i) $\frac{2\sqrt{6}}{3}$ (j) $4\sqrt{3}$ (k) $10\sqrt{7}$ (l) $\frac{3\sqrt{6}}{2}$