

Surds

1. Simplify the following surds.

(a) $\sqrt{8}$	(b) $\sqrt{20}$	(c) $\sqrt{32}$	(d) $\sqrt{18}$	(e) $\sqrt{200}$	(f) $\sqrt{80}$
(g) $\sqrt{48}$	(h) $\sqrt{75}$	(i) $\sqrt{72}$	(j) $\sqrt{98}$	(k) $\sqrt{128}$	(l) $\sqrt{243}$

2. Multiply and simplify where possible.

(a) $\sqrt{5} \times \sqrt{10}$	(b) $\sqrt{6} \times \sqrt{12}$	(c) $\sqrt{3} \times \sqrt{6}$	(d) $\sqrt{2} \times \sqrt{24}$
(e) $\sqrt{8} \times \sqrt{5}$	(f) $\sqrt{2} \times \sqrt{10}$	(g) $\sqrt{5} \times \sqrt{5}$	(h) $\sqrt{10} \times \sqrt{10}$
(i) $\sqrt{8} \times \sqrt{8}$	(j) $\sqrt{a} \times \sqrt{a}$	(k) $\sqrt{y} \times \sqrt{y}$	(l) $3\sqrt{5} \times 2\sqrt{2}$
(m) $2\sqrt{6} \times 4\sqrt{8}$	(n) $\sqrt{10} \times 2\sqrt{2}$	(o) $3\sqrt{5} \times 2\sqrt{2}$	(p) $6\sqrt{3} \times (-2\sqrt{6})$

3. Simplify the following.

(a) $\sqrt{8} + 3\sqrt{2} - \sqrt{32}$	(b) $\sqrt{50} + \sqrt{72} - 3\sqrt{2}$	(c) $\sqrt{48} - \sqrt{75} + 2\sqrt{3}$
(d) $\sqrt{200} + 3\sqrt{2} - \sqrt{128}$	(e) $\sqrt{50} + \sqrt{18} - \sqrt{2}$	(f) $\sqrt{48} + \sqrt{27} - 2\sqrt{3}$
(g) $\sqrt{20} + \sqrt{45} - \sqrt{80}$	(h) $\sqrt{40} + \sqrt{90} - \sqrt{160}$	(i) $\sqrt{48} + \sqrt{50} + 3\sqrt{2} - \sqrt{75}$

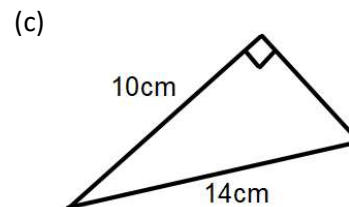
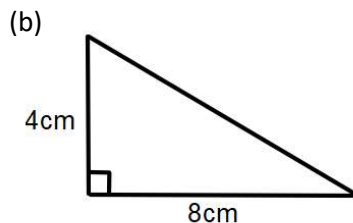
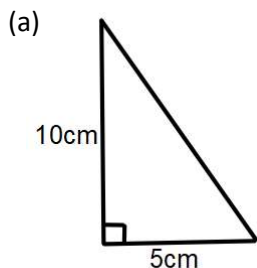
4. Multiply out the brackets and simplify.

(a) $\sqrt{5}(2 + \sqrt{8})$	(b) $\sqrt{3}(\sqrt{8} + \sqrt{3})$	(c) $\sqrt{2}(1 + \sqrt{10})$
(d) $\sqrt{10}(2\sqrt{5} + \sqrt{10})$	(e) $(2 + \sqrt{8})(\sqrt{5} + 3)$	(f) $(\sqrt{2} + \sqrt{5})(\sqrt{5} - 1)$

5. Rationalise the denominator.

(a) $\frac{3}{\sqrt{2}}$	(b) $\frac{1}{\sqrt{3}}$	(c) $\frac{2}{\sqrt{2}}$	(d) $\frac{10}{\sqrt{6}}$
(e) $\frac{10}{\sqrt{5}}$	(f) $\frac{3\sqrt{2}}{\sqrt{3}}$	(g) $\frac{5\sqrt{3}}{\sqrt{5}}$	(h) $\frac{6}{2\sqrt{2}}$
(i) $\frac{1}{2\sqrt{3}}$	(j) $\frac{4}{5\sqrt{2}}$	(k) $\frac{2}{\sqrt{8}}$	(l) $\frac{4}{\sqrt{12}}$
(m) $\frac{8}{\sqrt{8}}$	(n) $\frac{12}{\sqrt{27}}$	(o) $\frac{\sqrt{3}}{\sqrt{10}}$	(p) $\frac{\sqrt{20}}{\sqrt{60}}$

6. Calculate the length of the missing side of each right angled triangle, leaving your answer as a surd in simplest form.



7. Calculate, leaving your answer as a fraction with a rational denominator.

(a) $\frac{2}{\sqrt{3}} \times \frac{4}{\sqrt{2}}$

(b) $\frac{1}{\sqrt{2}} \times \frac{4}{\sqrt{5}}$

(c) $\frac{\sqrt{3}}{\sqrt{2}} \times \frac{2}{\sqrt{5}}$

(d) $\frac{3}{\sqrt{2}} \div \frac{1}{\sqrt{2}}$

(e) $\frac{12}{\sqrt{3}} \div \frac{2}{\sqrt{5}}$

(f) $\frac{1}{\sqrt{3}} + \frac{1}{3}$

(g) $\frac{2}{3} - \frac{6}{\sqrt{2}}$

8. Calculate the area of the shapes, giving your answer as a surd in simplest form.

