

(1) Simplify the following:

- (a) $\sqrt{36}$
- (b) $\sqrt{8}$
- (c) $\sqrt{12}$
- (d) $\sqrt{27}$
- (e) $\sqrt{50}$
- (f) $\sqrt{1200}$
- (g) $\sqrt{a^2}$
- (h) $(\sqrt{3})^3$
- (i) $(36\sqrt{5^4})^{\frac{1}{2}}$

(2) Simplify the following:

- (a) $\sqrt{6} \times \sqrt{6}$
- (b) $\sqrt{2} \times \sqrt{5}$
- (c) $\sqrt{3} \times \sqrt{6}$
- (d) $\sqrt{2} \times \sqrt{6}$
- (e) $\sqrt{14} \times \sqrt{7}$
- (f) $\sqrt{\frac{2}{3}} \times \sqrt{3}$
- (g) $\sqrt{2} \times \sqrt{2} \times \sqrt{2}$
- (h) $\sqrt{a} \times \sqrt{a}$
- (i) $2\sqrt{5} \times 3\sqrt{7}$
- (j) $p\sqrt{q} \times 3p^2\sqrt{q}$
- (k) $\frac{\sqrt{12}}{\sqrt{3}}$

(3) Simplify the following:

- (a) $\sqrt{3} + \sqrt{3}$
- (b) $2\sqrt{5} + \sqrt{5}$
- (c) $7\sqrt{3} - 2\sqrt{3}$
- (d) $\sqrt{2} + \sqrt{8}$
- (e) $\sqrt{50} + 3\sqrt{5}$
- (f) $\sqrt{27} + 2\sqrt{3} - \sqrt{12}$
- (g) $\sqrt{a} + 3\sqrt{4a^2} - 5\sqrt{a \times a}$

(4) Simplify the following:

- (a) $\sqrt{2}(3 + \sqrt{2})$
- (b) $\sqrt{3}(4 - \sqrt{12})$
- (c) $\sqrt{p}(4 - 3\sqrt{p})$
- (d) $2\sqrt{p}(1 + 3\sqrt{p^3})$
- (e) $\sqrt{3}(\sqrt{6} - \sqrt{27})$

(5) Simplify the following:

- (a) $(1 + \sqrt{3})(\sqrt{3} + 4)$
- (b) $(4 + \sqrt{7})(4 - \sqrt{7})$
- (c) $(2 - \sqrt{5})(1 - \sqrt{10})$
- (d) $(4 - \sqrt{p})(5 - 3\sqrt{p})$
- (e) $(a + \sqrt{b})(a - \sqrt{b})$
- (f) $a(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b})$

(6) Rationalise the denominator of the following fractions:

- (a) $\frac{1}{\sqrt{3}}$
- (b) $\frac{2}{\sqrt{5}}$
- (c) $\frac{3}{4\sqrt{7}}$
- (d) $\frac{6}{5\sqrt{2}}$
- (e) $\frac{3}{8\sqrt{t}}$
- (f) $\frac{2\sqrt{27}}{5\sqrt{12}}$
- (g) $\frac{\sqrt{3}}{(1 - \sqrt{3})(1 + \sqrt{27})}$

(7) Rationalise the denominator of the following fractions:

- (a) $\frac{1}{1 + \sqrt{5}}$
- (b) $\frac{1}{1 - \sqrt{3}}$
- (c) $\frac{5}{2 - \sqrt{7}}$
- (d) $\frac{5 + \sqrt{7}}{4 - \sqrt{7}}$
- (e) $\frac{2 + \sqrt{12}}{5 - \sqrt{3}}$
- (f) $\frac{5 + \sqrt{2}}{3 - \sqrt{8}}$
- (g) $\frac{\sqrt{2}}{1 - \sqrt{32}}$
- (h) $\frac{a + \sqrt{b}}{a - \sqrt{b}}$

(8) Write $\frac{1}{\sqrt{27}} + \frac{2}{\sqrt{3}}$ as a single fraction in its lowest form.

(9) Given $\frac{a - \sqrt{b}}{1 - \sqrt{8}} \equiv 2 + \sqrt{2}$ find the values of a and b .

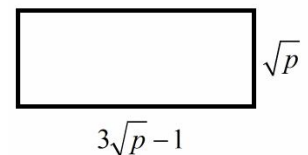
(10) Solve the equation $3x + 4 = \sqrt{2}x + 6$ writing your answer as a rational fraction.

(11) Simplify $(4p)^{\frac{3}{2}} \times 3\sqrt{p}$ leaving your answer in the form ap^n .

(12) Solve the equation

$$\sqrt{x} - \frac{6}{\sqrt{x}} = 1$$

(13) (a) Find the perimeter of the rectangle below giving your answer in terms of p .

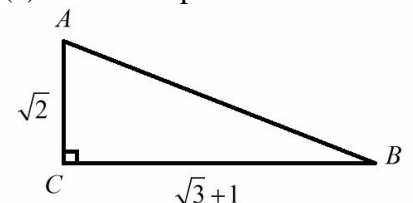


(b) Given the perimeter of the rectangle 38cm find the area of the rectangle.

(14) The triangle ABC is shown below.

$$AC = \sqrt{2} \text{ \& } BC = \sqrt{3} + 1.$$

(a) Find an expression for AB^2 .



(b) Show the area of the triangle can be written in the form

$$\frac{\sqrt{a} + \sqrt{b}}{a}$$

stating the values of a and b .

(15) Solve the equation

$$x^2 - 2\sqrt{3}x - 7 = 0$$

Give your answer in the form

$$x = \sqrt{a} \pm \sqrt{b}.$$