

1. Factorise each of the following:

(a) $x^2 - 4$

(c) $x^2 + 7x + 6$

(e) $x^2 + 11x + 24$

(g) $x^2 - x - 6$

(i) $x^2 - 5x + 6$

(k) $x^2 - 81$

(b) $x^2 - 25$

(d) $x^2 + 7x + 10$

(f) $x^2 + 14x + 49$

(h) $x^2 + 2x - 3$

(j) $x^2 - 7x + 10$

(l) $1 - x^2$

2. Remove brackets and simplify:

(a) $(2x+3)(2x+1)$

(c) $(2x+5)(x-3)$

(e) $(5x+1)(3x-4)$

(g) $(2x+3y)(4x-y)$

(b) $(2x-1)(2x+1)$

(d) $(3a-2)(2a-3)$

(f) $(3y-5)(2y+3)$

(h) $(5a-2b)(2a+3b)$

3. (a) A shopkeeper buys a video for £120 and sells it for £150.

Calculate:

(i) the profit as a percentage of the cost price.

(ii) the profit as a percentage of the selling price.

(b) In a school with a roll of 890, 117 pupils are absent.

What percentage of pupils are absent?

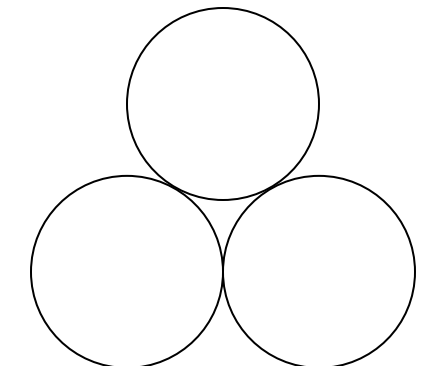
(c) A car cost £12500 new. Two years later it is traded in for £7900.

Calculate the percentage depreciation over the two years.

4. (a) Express $\sqrt{108}$ as a surd in its simplest form

(b) Each of the touching circles below has radius 6 cm.

Find the total height of the stack, giving your answer in the form $a + b\sqrt{c}$, where a , b and c are positive integers.



5. Evaluate:

(a) 2^{-3} (b) $8^{\frac{2}{3}}$ (c) $81^{\frac{3}{4}}$ (d) $27^{-\frac{2}{3}}$

6. Simplify, leaving your answer in index form:

(a) $3^3 \times 3^2$ (b) $x^{\frac{1}{2}} \times x^{\frac{3}{2}}$ (c) $a^5 \div a^{-2}$
(d) $(a^3)^2$ (e) $\frac{a^2 \times a^4}{a^{-3}}$ (f) $\frac{p^{\frac{1}{2}} \times p^{\frac{3}{4}}}{p}$

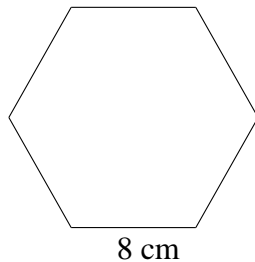
7. Simplify:

(a) $\sqrt{12} + \sqrt{3}$ (b) $\sqrt{98} - \sqrt{32}$ (c) $\sqrt{20} + \sqrt{80}$

8. Express with a rational denominator:

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{2}{\sqrt{5}}$ (c) $\sqrt{\frac{8}{24}}$

9. The regular hexagon sketched below has sides of length 8 cm.
Calculate its area.



10. (a) Expand and simplify $(a+2)^2$.
(b) By writing $(a+2)^3 = (a+2)(a+2)^2$, and using part (a), expand and simplify $(a+2)^3$.
11. Use the ideas of Q 10 to expand $(x-1)^3$.
12. Expand and simplify $(2x-3)(x^2-3x-2)$.