

1 Like terms and brackets



a) Expand and simplify

$$2x(3x - y) - y(4x - 5y)$$

b) Show that $3(2n + 1) - 2(n - 4) + 1$ is a multiple of 4 for every whole number n .

$$a) 6x^2 - 6xy + 5y^2$$

$$b) 6n + 3 - 2n + 8 + 1$$

$$= 4n + 12 = 4(n + 3)$$

2 Double and triple brackets



a) Expand and simplify

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

b) $(x + k)(x - 2)(x + 3)$ has an x^2 term of $5x^2$. Find k and the constant term.

$$a) (2x^2 - 5x - 3)(3x - 2)$$

$$= 6x^3 - 19x^2 + x + 6$$

$$b) (x^2 + x - 6)(x + k): k + 1 = 5, k = 4$$

$$\text{constant } -6k = -24$$

3 Factorising: one bracket



Factorise fully

$$a) 15a^3b^2k - 25a^2b^3k^2$$

$$b) x(y - 3) - 4(3 - y)$$

$$a) 5a^2b^2k(3a - 5bk)$$

$$b) x(y - 3) + 4(y - 3)$$

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

4 Factorising quadratics



Factorise fully

$$a) x^2 + 5xy - 24y^2$$

$$b) x^4 - 13x^2 + 36$$

$$a) (x + 8y)(x - 3y)$$

$$b) (x^2 - 4)(x^2 - 9)$$

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

5 Harder factorising



Factorise

$$a) 12x^2 + 7x - 10$$

$$b) (2x + 3)^2 - (x - 4)^2$$

$$a) (3x - 2)(4x + 5)$$

$$b) (2x + 3 - x + 4)(2x + 3 + x - 4)$$

$$(x + 7)(3x - 1)$$

Expanding brackets, factorising and solving quadratics revision mat answers



6 Algebraic fractions



$$a) \text{Simplify } \frac{6x^2 - x - 2}{4x^2 - 1}$$

$$b) \text{Simplify } \frac{3}{x+2} - \frac{x-4}{x^2-4}$$

$$a) \frac{(3x-2)(2x+1)}{(2x-1)(2x+1)} = \frac{3x-2}{2x-1}$$

$$b) \frac{3(x-2) - (x-4)}{(x+2)(x-2)}$$

$$= \frac{2(x-1)}{(x+2)(x-2)}$$

7 Solving by factorising



Solve

$$a) 6x^2 = x + 15$$

$$b) \frac{2}{x} + \frac{3}{x+1} = 2$$

$$a) (3x - 5)(2x + 3) = 0$$

$$x = \frac{5}{3} \text{ or } -1.5$$

$$b) 2(x + 1) + 3x = 2x(x + 1)$$

$$(2x + 1)(x - 2) = 0, x = -0.5 \text{ or } 2$$

8 The quadratic formula



a) Solve $3x^2 - 2x - 6 = 0$, giving your answers in the form $\frac{a \pm \sqrt{b}}{c}$.

b) A rectangle is 3 cm longer than it is wide. Its diagonal is 10 cm. Find its width to 2 decimal places.

$$a) \frac{2 \pm \sqrt{76}}{6} = \frac{2 \pm 2\sqrt{19}}{6} = \frac{1 \pm \sqrt{19}}{3}$$

$$b) 2w^2 + 6w - 91 = 0$$

$$w = 5.41 \text{ cm}$$

9 Completing the square



a) Write $2x^2 - 12x + 7$ in the form $a(x + b)^2 + c$

b) Show that $x^2 + 6x + 11$ is positive for every value of x .

$$a) 2(x^2 - 6x) + 7 = 2(x - 3)^2 - 11$$

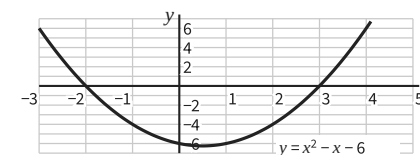
$$b) (x + 3)^2 + 2 \geq 2 > 0$$

10 Quadratic graphs



a) Find the exact turning point.

b) Draw a line to solve $x^2 - 2x - 8 = 0$.



$$a) (x - 0.5)^2 - 6.25: (0.5, -6.25)$$

$$b) y = x + 2 \text{ meets it at } x = -2, 4$$