Algebra

Algebra Notation

$a \times b = ab$

$a \times a \times a = a^3$

$a \div b = \frac{a}{b}$

Algebra Vocab

$A = xy$ (formula)

$x + 3$ (expression)

$5x + 1 = 16$ (equation)

$x + 2x = 3x$ (identity)

Simplifying & collecting 'like' terms.

- add, take, collect terms.
- remember the signs.

eg. $2a + 3b + 5a - b$

$= 7a + 2b$

- multiply / divide numbers then use laws of indices.

eg $3x \times 2xy \Rightarrow 6x^2y$

eg $\frac{10x^3y}{5xy} = 2x^2$

Factorise

- put into brackets
- find common factors

- $3x + 9 = 3(x + 3)$
- $x^2 + 2x = x(x + 2)$
- $4x^2 - 8xy = 4x(x - 2y)$

Quadratics

$x^2 - 7x + 10$

$\times = 10$

$+ = -7$

$-5, -2$

$(x - 5)(x - 2)$

$6x^2 - 13x - 5$

$\times -30$

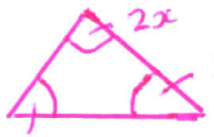
$+ -13$

$2, -15$

$(6x + 2)(6x - 15)$

$(3x + 1)(2x - 5)$

Build and Solve



- Angles in a triangle = 180

$2x + x + 70 + x + 30 = 180$

$4x + 100 = 180$

$-100 \quad -100$

$4x = 80$

$\div 4 \quad \div 4$

$x = 20$

Angles → $2x = 2 \times 20 = 40°$

→ $x + 70 = 20 + 70 = 90°$

→ $x + 30 = 20 + 30 = 50°$

Nth term rule.

Find the nth term rule

$3n \leftarrow$ (+3, +3)

5, 8, 11, 14, 17

(+2, +2) ← (+2)

3, 6, 9, 12

$= 3n + 2$

Quadratics

5, 8, 13, 20, ...

- find second difference and ÷ 2

$2 \div 2 = 1 \leftarrow$ (+3, +5, +7)

5, 8, 13, 20

n^2: 1, 4, 9, 16 (+4, +4, +4)

$n^2 + 4$

Writing formula & expressions

Chloe is x years old. Her sister is 3 years older. Write an expression for her age $\Rightarrow x + 3$.

Neil buys y packets of sweets costing 45p per packet. He pays T pence altogether. Write a formula for the total cost. $\Rightarrow T = 45y$

The length of 5 rods equals P. Write a formula for the lengths.

$x \quad x \quad x \quad \Rightarrow 3x = P$

Expanding

- Remember to multiply everything by each other!

$2(3x + 1) = 6x + 2$

$3x(4x + 2) = 12x^2 + 6x$

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

$6x + 4 + 12x - 12$

$18x - 8$

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

$x^2 + 3x + 2x + 6$

$= x^2 + 5x + 6$

Solve equations.

$2x + 8 = 7$

$-5 \quad -5$

$2x = 2$

$\div 2 \quad \div 2$

$x = 1$

$2x + 4 = 3(2x + 1)$

$2x + 4 = 6x + 3$

$-2x \quad -2x$

$4 = 4x + 3$

$-3 \quad -3$

$1 = 4x$

$\div 4 \quad \div 4$

$\frac{1}{4} = x$