Title

Key Knowledge/Prior Learning KS2/3 and Retrieval and Suggested Starters
• Negative numbers • Key Angle facts • Perimeter • Area • Forming expressions • Expanding brackets

KS3 National Curriculum – what students will be practicing and Key Questions
• Use function machines with numbers and algebra • Solving equations: -One step -Two step -With Brackets -Equations with fractions -Unknowns on both sides -Unknowns on both sides with negatives on both sides -Unknowns on both sides with brackets • Forming and solving equations.

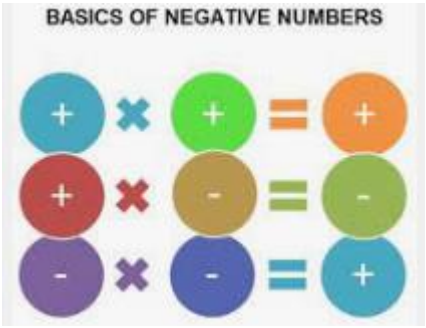
Specific Ambitious Knowledge

Key Vocabulary/Literacy Opportunities
• Operation • Function • Expression • Equation • Term • Expand • Unknown • Inverse operation • Balance • Solve • Coefficient • Variable • Solution

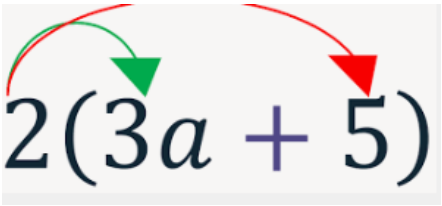
Key Formulae/Knowledge and Misconceptions

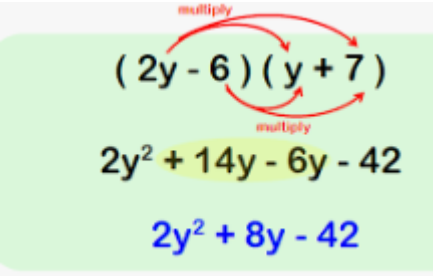
Expanding:

Negative number rules:

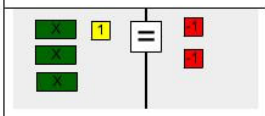
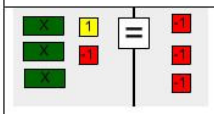
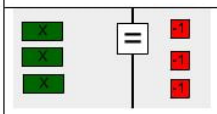
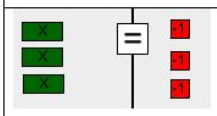
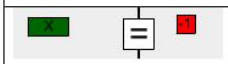


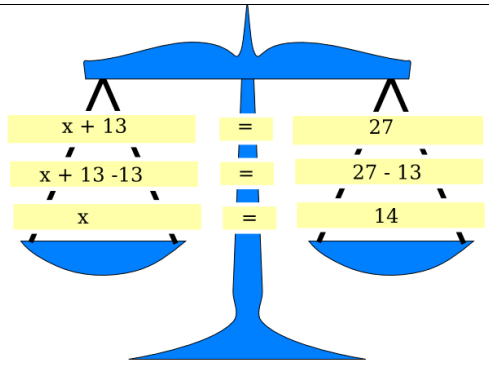
Foil expanding



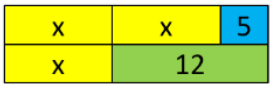


Visual Representations:

Model	Algebraic	Description
	$3x+1=-2$	3 times a number plus 1 equals -2.
	$3x+1=-2$ $-1=-1$	Subtract 1 from both sides.
	$3x=-3$	3 times a number equals -3.
	$\frac{3x}{3}=\frac{-3}{3}$	Divide both sides by 3.
	$x=-1$	$x=-1$



Bar Model



$2x + 5 = x + 12$

- x - x

$x + 5 = 12$

- 5 - 5

$x = 7$

Solving equations – balancing linked to function machines

Balancing method

$8a - 5 = 11$

$+5 \quad +5$

$8a = 16$

$\div 8 \quad \div 8$

$a = 2$

Function machine method

$8a - 5 = 11$

$a \rightarrow \times 8 \rightarrow -5 \rightarrow 11$

$2 \leftarrow \div 8 \leftarrow +5 \leftarrow 11$

$a = 2$

Balancing method

$10 + 6y = 34$

$-10 \quad -10$

$6y = 24$

$\div 6 \quad \div 6$

$y = 4$

Function machine method

$10 + 6y = 34$

$y \rightarrow \times 6 \rightarrow +10 \rightarrow 34$

$4 \leftarrow \div 6 \leftarrow -10 \leftarrow 34$

$y = 4$

Balancing method

$\frac{x}{12} - 5 = 4$

$+5 \quad +5$

$\times 12 \quad \frac{x}{12} = 9 \quad \times 12$

$x = 108$

Function machine method

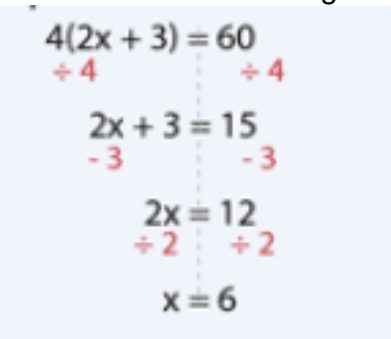
$\frac{x}{12} - 5 = 4$

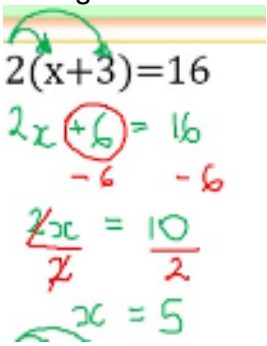
$x \rightarrow \div 12 \rightarrow -5 \rightarrow 4$

$108 \leftarrow \times 12 \leftarrow +5 \leftarrow 4$

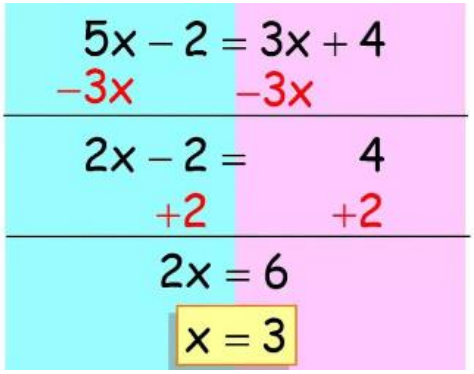
$x = 108$

With brackets – dividing Vs expanding





Unknowns on both sides



Maths in Context (Historical, Real Life and Student Thinking Points)

Projects/Enrichment/Investigations
• Rich maths: https://www.tes.com/teaching-resource/rich-maths-task-27-solving-linear-equations-11070004 • Creating equations: equation webs • Form and solve treasure hunt • Forming and solving tick or trash Project Ideas: