Y10 FOUNDATION HT1 EXPRESSIONS, FORMULAE AND EQUATIONS

Single function machines

INPUT → [ ] → OUTPUT

The number that goes IN — The number that comes out

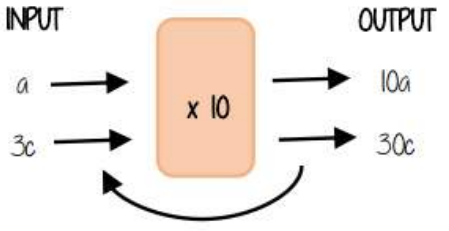
This box gives the calculation instruction

To find the input from the output
Use the **INVERSE** operation

Using letters to represent numbers

5 + 5 + 5	y + y + y + y	20 - h
3 x 5	y x 4	$\frac{20}{h}$
5 x 3	4 x y	
	4y	
Addition and multiplication can be done in any order **Commutative calculations**	↑ 4 lots of 'y'	↑ 20 shared into 'h' number of groups

Single function machines (algebra)



To find the input from the output
Use the **INVERSE** operation

Find functions from expressions

INPUT 7x → [?] → OUTPUT 14x

Find the relationship between the input and the output

Sometimes there can be a number of possible functions. e.g. **+7x** or **x 2** could both be solutions to the above function machine

Substitution into expressions

4y ← 4 lots of 'y'

If y = 7 this means the expression is asking for 4 'lots of' 7

4 x 7 **OR** 7 + 7 + 7 + 7 **OR** 7 x 4 = 28

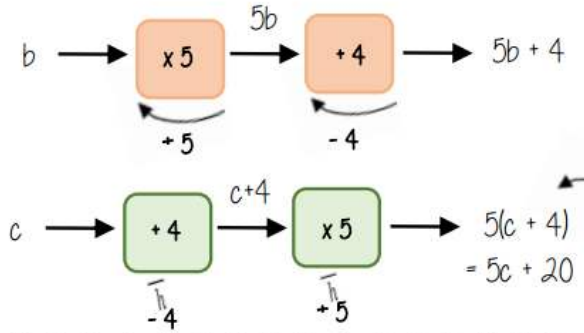
e.g. $y - 2$
$= 7 - 2 = 5$

Two step function machines

Calculate the value at the end of each operation

For the input use the **INVERSE** operations

Two step function machines (algebra)



IMPORTANT
Calculate the value at the end of each operation

NOTE:
The whole first output is multiplied by 5

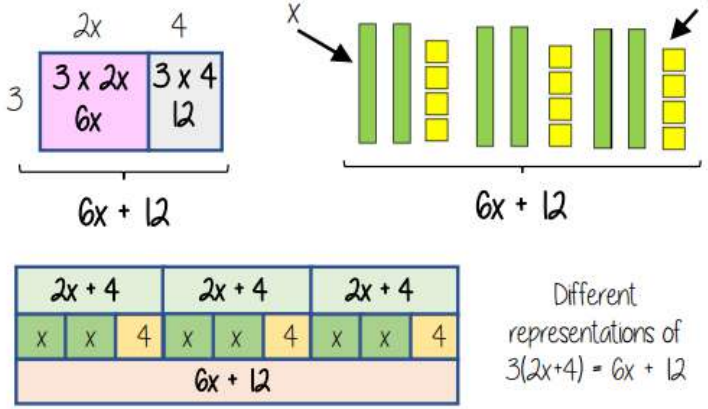
Formulae and Equations

Substitute in values

Formulae – all expressed in symbols → **Equations** – include numbers and can be solved

Y10 FOUNDATION HT1 EXPRESSIONS, FORMULAE AND EQUATIONS

Multiply single brackets 3 (2x + 4)



Different representations of 3(2x+4) = 6x + 12

Equations with unknown on both sides

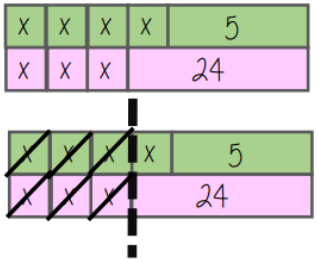
4x + 5 = 3x + 24

-3x -3x

x + 5 = 24

-5 -5

x = 19



Keywords

Inverse: the operation that undoes what was done by the previous operation. (The opposite operation)

Commutative: the order of the operations do not matter.

Substitute: replace one variable with a number or new variable.

Evaluate: work out

Simplify: grouping and combining similar terms

Equivalent: something of equal value

Coefficient: a number used to multiply a variable

Solve: find a numerical value that satisfies an equation

Algebraic constructs

Expression

A sentence with a minimum of two numbers and one maths operation

Equation

A statement that two things are equal

Term

A single number or variable

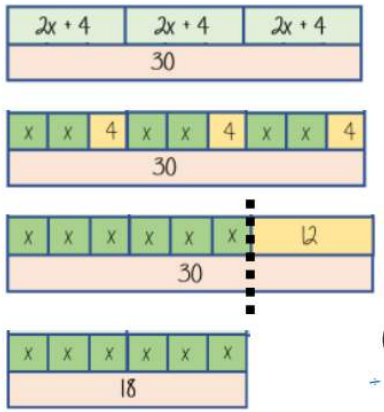
Identity

An equation where both sides have variables that cause the same answer includes ≡

Formula

A rule written with all mathematical symbols e.g. area of a rectangle A = b x h

Solve equations with brackets (R)



3 (2x + 4) = 30

Expand the brackets

6x + 12 = 30

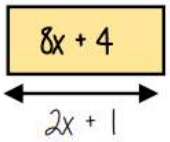
-12 -12

6x = 18

÷ 6 ÷ 6

x = 3

Factorise into a single bracket 8x + 4



Try and make this the **highest common factor**

The two values **multiply** together (also the area) of the rectangle

8x + 4 ≡ 4 (2x + 1)

Note:
8x + 4 ≡ 2(4x + 2)
This is factorised but the HCF has not been used