ALGEBRA

Autumn term

Algebra 1

Topics

- Expanding brackets
- Solving equations
- Linear Inequalities

What do I need to be able to do?

- Be able to expand single and double brackets
- Be able to solve 1 and 2 step equations
- Be able to solve equations with unknowns on both sides
- Be able to use and solve inequalities and show on a number line

Key Vocabulary

Expand	Multiplying to remove the brackets
Simplify	An expression is in its simplest form when it is easiest to use
Bracket	Symbols used in pairs to group things together
Coefficient	A number used to multiply a variable
Solve	To find a value (or values) we can put in place of a variable that makes the equation true
Equation	An equation says that two things are equal
Balance	When both sides have the same quantity or mass
Inequality	An inequality compares two values, showing if one is less than, greater than or simply not equal to another value
Greater than	Bigger (>)
Less than	Smaller (<)

Career Links

Being able to confidently work with numbers is a great skill to have and has lots of links with a number of careers such as:

- Accountancy/banking
- Insurance
- Engineering
- Construction
- Carpenter

$(p + 2)(2p - 1)$

$= 2p^2 + 4p - p - 2$

$= 2p^2 + 3p - 2$

$(p + 2)^2$

$(p + 2)(p + 2)$

$= p^2 + 2p + 2p + 4$

$= p^2 + 4p + 4$

Solve 2d - 7 = 5d - 10

Start by subtracting the smallest amount of the variable from both sides

-2d -2d

-7 = 3d - 10

+10 +10

3 = 3d

÷3 ÷3

d = 1

7 (3 + a) = 21 + 7a

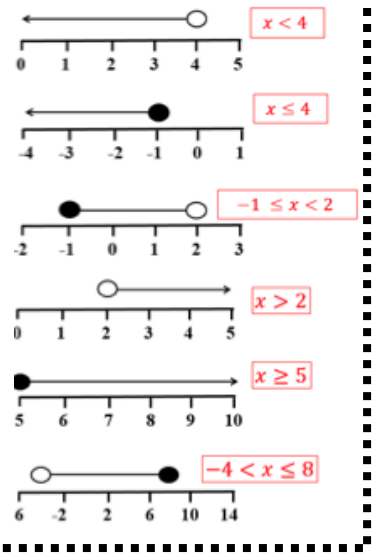
2(5 + a) + 3(2 + a) =

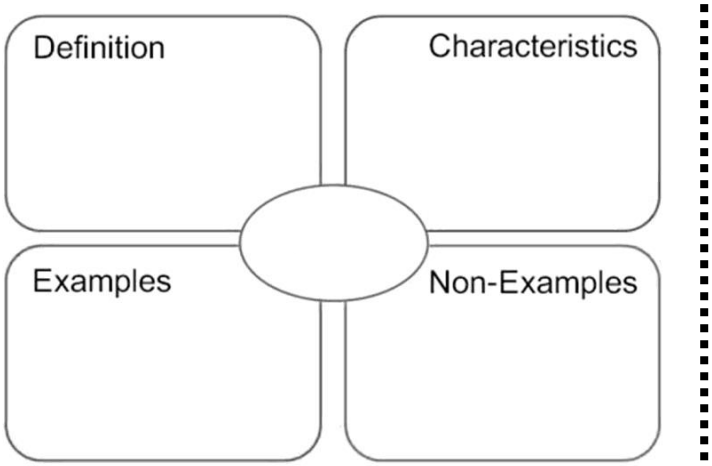
=

= 10 + 2a + 6 + 3a

= 5a + 16

Note – collect like terms to simplify





$3(x - 2) \leq 14 - x$

$3x - 6 \leq 14 - x$

$+x \quad +x$

$4x - 6 \leq 14$

$+6 \quad +6$

$4x \leq 20$

$\div 4 \quad \div 4$

$x \leq 5$

Year 8 – Knowledge Organiser

ALGEBRA

Autumn term

Algebra 2

Topics

- Rearranging simple formula
- Substitution

What do I need to be able to do?

- Be able to substitute numbers into formulae
- Change the subject of a formula

Key Vocabulary

Equation	An equation says that two things are equal
Like Terms	Terms whose variables (such as x or y) are the same
Simplify	An expression is in its simplest form when it is easiest to use
Substitute	Putting values where the letters are
Term	A term is either a single number or variable, or numbers and variables multiplied together
Expression	Numbers, symbols, and operators grouped together to show the value of something
Formula	A rule or fact written with mathematical symbols
Solve	To find a value we can put in place of a variable that makes the equation true
Rearrange	Change the subject of a formula
Inverse	The operation that reverses the effect of another operation

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$a = 2, \quad b = 3, \quad c = -5$

1. $4b = 4 \times 2 = 8$

Note – Always use the correct order of operations

2. $7b - 3c = (7 \times 3) - (3 \times -5) = 21 - -15 = 21 + 15 = 36$
3. $5b^2 + 1 = 5 \times (3)^2 + 1 = 5 \times 9 + 1 = 45 + 1 = 46$
4. $2c^3 = 2 \times (-5)^3 = 2 \times -125 = -250$
5. $\frac{3ac}{2b} = \frac{3 \times 2 \times -5}{2 \times 3} = \frac{-30}{6} = -5$

For fractions work out the numerator and denominator separately first

Rearranging Formulae

Change the order of the terms so 'u' is on its own

Make u the subject: $v = u + at$

$-at$ $\quad -at$

$v - at = u$

so $u = v - at$

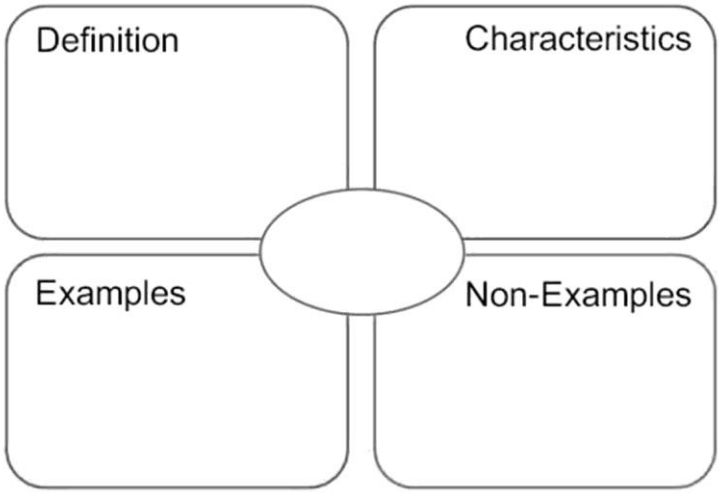
Make m the subject: $l = mv - mu$

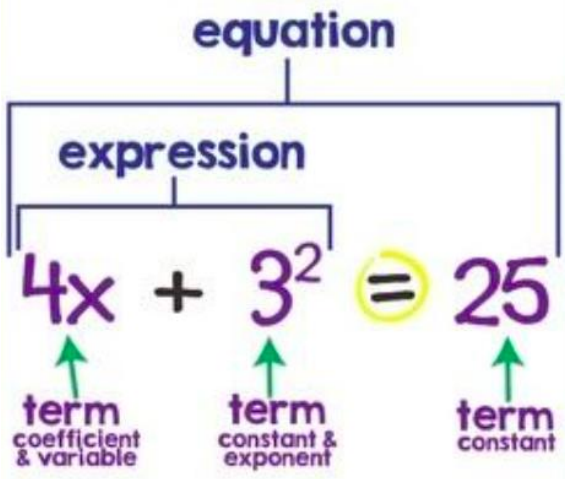
If the letter appears twice you will need to factorise

$\div (v-u)$ $\quad l = m(v-u)$ $\quad \div (v-u)$

$l \div (v-u) = m$

$m = \frac{l}{v-u}$





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