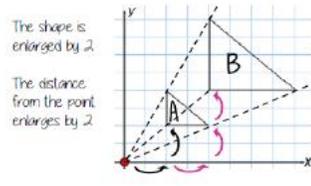
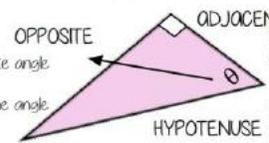
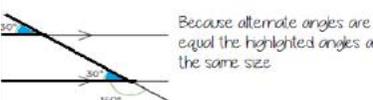
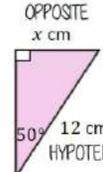
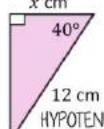
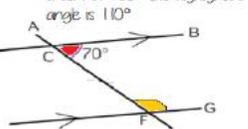
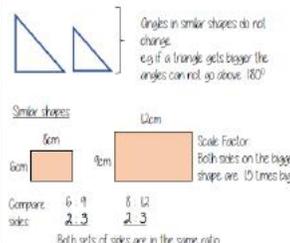
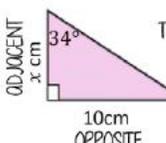
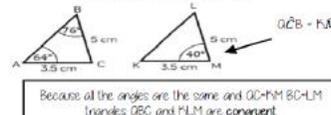
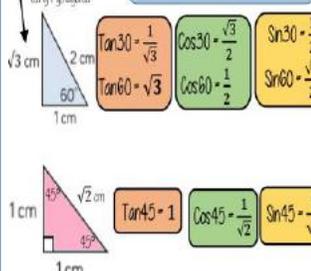
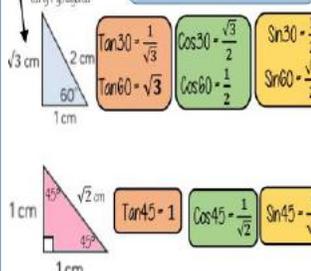
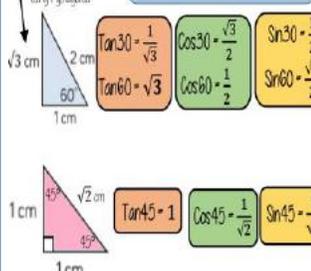
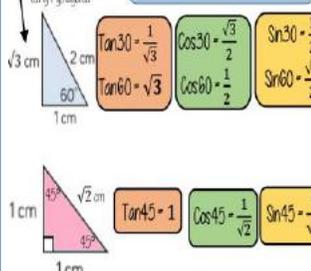
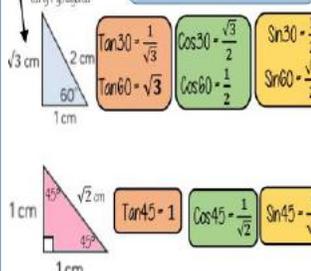
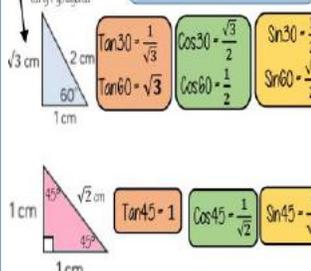
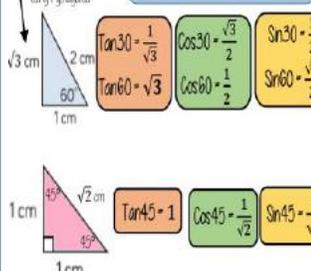
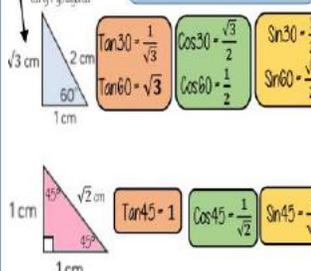


Maths Autumn Term 1

Section A: Vocabulary		Section B:		Section C:	
Vocabulary	Definition				
Adjacent side	Next to the angle in question	Positive scale factors R Enlargement from a point Enlarge shape A by SF 2 from (0,0) 		Fractional scale factors R Fractions less than 1 make a shape SMALLER <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> R is an enlargement of P by a scale factor $\frac{1}{3}$ from centre of enlargement (15,1) </div> 	
Centre of enlargement	The point at which the shape is enlarged from			Hypotenuse, adjacent and opposite ONLY right-angled triangles are labelled in this way 	
Congruent	When two or more objects have the same shape and size. They can be a reflection, rotation or translation of each other, NOT an enlargement. All corresponding angles and lengths are the same	Angles in parallel lines R Alternate angles Because alternate angles are equal the highlighted angles are the same size 		Sin and Cos ratio: side lengths <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> OPPOSITE x cm  </div> <div style="background-color: yellow; padding: 5px; border: 1px solid black;"> $\text{Sin}\theta = \frac{\text{opposite side}}{\text{hypotenuse side}}$ </div> <div style="text-align: center;"> ADJACENT x cm  </div> </div> <div style="background-color: green; padding: 5px; border: 1px solid black; margin-top: 5px;"> $\text{Cos}\theta = \frac{\text{adjacent side}}{\text{hypotenuse side}}$ </div>	
Constant	A value that remains the same	Co-interior angles Because co-interior angles have a sum of 180° the highlighted angle is 110° 		Tangent ratio: side lengths <div style="background-color: orange; padding: 5px; border: 1px solid black; margin: 5px auto;"> $\text{Tan}\theta = \frac{\text{opposite side}}{\text{adjacent side}}$ </div>	
Cosine ratio	The ratio of the length of the adjacent side to that of the hypotenuse	Corresponding angles Because corresponding angles are equal the highlighted angles are the same size 		Sin, Cos, Tan: Angles <div style="background-color: lightblue; padding: 5px; border: 1px solid black; margin: 5px auto;"> Inverse trigonometric functions </div>	
Enlarge	to make a shape bigger (or smaller) by given multiplier	Identify similar shapes Angles in similar shapes do not change eg if a triangle gets bigger the angles cannot go above 180° 		Conditions for congruent triangles Triangles are congruent if they satisfy any of the following conditions: <ul style="list-style-type: none"> Side-side-side: All three sides on the triangle are the same size Angle-side-angle: Two angles and the side connecting them are equal in two triangles Side-angle-side: Two sides and the angle in-between them are equal in two triangles (it will also mean the third side is the same size on both shapes) Right angle-hypotenuse-side: The triangles both have a right angle, the hypotenuse and one side are the same 	
Corresponding	Items that appear in the same place in two similar situations	Similar triangles Shares a vertex Because corresponding angles are equal the highlighted angles are the same size Parallel lines — all angles will be the same in both triangles As all angles are the same this is similar — I only need one pair of sides are needed to show equality Vertically opposite angles All the angles in both triangles are the same and so similar		Tanθ = opposite side / adjacent side Substitute the values into the tangent formula  $\text{Tan}34 = \frac{10}{x}$ $x \times \text{Tan}34 = 10$ $x = \frac{10}{\text{Tan}34} = 14.8\text{cm}$	
Hypotenuse	Longest side of a right angle triangle, opposite the right angle	Congruence and Similarity Congruent shapes are identical — all corresponding sides and angles are the same size 		Area (ASF) / Volume (VSF) Calculate the missing area: 1. Find SF: $16/8 = 2$ 2. Square SF: $2^2 = 4$ 3. Multiply $22 \times 4 = 88\text{cm}^2$ Calculate the missing volume: 1. Find SF: $20/10 = 2$ 2. Cube SF: $2^3 = 8$ 3. Divide $640 \div 8 = 80\text{cm}^3$	
Inverse	Function that has the opposite effect	Key angles Because key ratios remain the same for similar shapes you can generalize from the following statements 		Area (ASF) / Volume (VSF) Calculate the missing area: 1. Find SF: $16/8 = 2$ 2. Square SF: $2^2 = 4$ 3. Multiply $22 \times 4 = 88\text{cm}^2$ Calculate the missing volume: 1. Find SF: $20/10 = 2$ 2. Cube SF: $2^3 = 8$ 3. Divide $640 \div 8 = 80\text{cm}^3$	
Opposite side	Side opposite to the angle in question			Key angles Because key ratios remain the same for similar shapes you can generalize from the following statements 	
Scale factor of Enlargement	The ratio of the enlarged shape to the original shape			Key angles Because key ratios remain the same for similar shapes you can generalize from the following statements 	
SFE	Scale Factor of Enlargement			Key angles Because key ratios remain the same for similar shapes you can generalize from the following statements 	
Similar	When one shape can become another with a reflection, rotation, enlargement or translation. All corresponding angles are the same.			Key angles Because key ratios remain the same for similar shapes you can generalize from the following statements 	
Sine ratio	The ratio of the length of the opposite side to that of the hypotenuse			Key angles Because key ratios remain the same for similar shapes you can generalize from the following statements 	
Tangent Ratio	The ratio of the length of the opposite side to that of the adjacent			Key angles Because key ratios remain the same for similar shapes you can generalize from the following statements 	
Scale factor	Multiplier of enlargement			Key angles Because key ratios remain the same for similar shapes you can generalize from the following statements 	

Maths Autumn Term 2

Section A: Vocabulary	
Vocabulary	Definition
Balance the equation	A method for solving equations or inequalities by adding/subtracting/multiply/dividing terms to each side of the equality or inequality in order to solve the equation or inequality
Coordinate	A set of values to show an exact position. The x value is always first and the y is second. e.g. (3,-5) is a point 3 to the right and 5 down.
Eliminate	To remove.
Equation	An equation says that two things (expressions) are equal. It will have an equals sign =.
Expression	Numbers, symbols and operators (e.g. + -) grouped together to show the value of something. It does not have an equals sign.
Gradient	A measure of steepness of a linear line plotted on a coordinate plan
Identity	An equation where both sides have variables that cause the same answer. It will have a \equiv sign.
Inequality	An inequality compares two values showing if one is greater than, less than or equal to another
Intersection	The point where two lines meet
LCM	Lowest common multiple - first number in the times table of two or more numbers that match
Linear	An equation or function that is the equation of a straight line
Solve	The process of working out the solution to an equality or solution set for an inequality
Solution	A value we can put in place of a variable that makes the equation true.
Solution set	A set of values we can put in place of a variable that makes the inequation true.
Substitute	Replace a variable with a numerical value.
Variable	A symbol for a number we don't know
Y intercept	Where the plot of an equation crosses the Y axis

Section B:

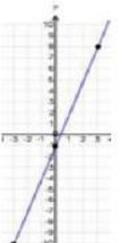
Plotting straight line graphs R

$y = 3x - 1$ → 3 x the x coordinate then -1

x	-2	0	3
y	-10	-1	8

Draw a table to display this information

This represents a coordinate pair (-3, -10)



You only need two points to form a straight line.

Plotting more points helps you decide if your calculations are correct (if they do make a straight line)

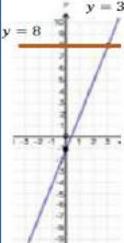
Remember to join the points to make a line.

Find solutions graphically

For linear equations there is only one point the graph meets the x axis.

These two lines will cross at (2,4) because they are just x and y they are parallel to axes and meet in one place.

$x = 2$
 $y = 4$



Remember equation of a line format is $y = mx + c$

The solution is the point the two lines meet **(3,8)**

Is (x, y) a solution?

x and y represent values that can be substituted into an equation

Does the coordinate (1,8) lie on the line $y = 3x - 5$?

This coordinate represents $x = 1$ and $y = 8$

$y = 3x + 5$
 $8 = 3(1) + 5$

As the substitution makes the equation correct, the coordinate (1,8) is on the line $y = 3x + 5$

Is (2,7) on the same line?

$7 \neq 3(2) + 5$
No 7 does NOT equal 6+5



Section C:

Substituting known variables

0 line has the equation $3x + y = 14$

Stephane knows the point $x = 4$ lies on that line. Find the value for y

$x = 4$

$3x + y = 14$	$3(4) + y = 14$	$12 + y = 14$	$y = 2$
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Two different variables, two solutions

Substituting in an expression

Substitute 2y in place of the x variable as they represent the same value

$x = 2y$

Pair of simultaneous equations (two intersecting lines)

$3y = 30$
 $y = 10$

$x = 2y$
 $x = 20$

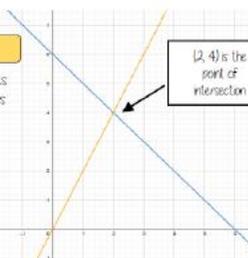
The solution that satisfies both equations is $x = 2$ and $y = 4$

Solve graphically

Linear equations are straight lines. The point of intersection provides the x and y solution for both equations

$x + y = 6$
 $y = 2x$

(2, 4) is the point of intersection



Solve equations R

$3(2x + 4) = 30$

Expand the brackets

$6x + 12 = 30$

-12 -12

$6x = 18$

-6 -6

$x = 3$

Substitute to check your answer. This could be negative or a fraction or decimal



Maths Revision:

<https://www.mathsgenie.co.uk/gcse.html>

Equations: unknown on both sides R

$8x + 5 = 4x + 13$

$8x + 5 = 4x + 13$
 $-4x$ $-4x$
 $4x + 5 = 13$
 -5 -5
 $4x = 8$
 $\div 4$ $\div 4$
 $x = 2$

Inequalities: unknown on both sides

$8x + 5 \leq 4x + 13$ → $x \leq 2$

Any value 2 or less will satisfy this inequality.



Form and solve inequalities R

Two more than triple my number is greater than 11

Form $x \rightarrow 3x \rightarrow +2 \rightarrow 11$ → $3x + 2 > 11$

Solve $x \leftarrow -3 \leftarrow -2 \leftarrow 11$ → $x > 3$

Solve by adjusting one

$h + j = 12$ No equivalent values
 $2h + 2j = 29$

$2h + 2j = 24$
 $2h + 2j = 29$

By proportionally adjusting one of the equations - now solve the simultaneous equations choosing an addition or subtraction method

Solve by addition

Addition makes zero pairs

$3x + 2y = 16$
 $+ 6x - 2y = 2$

$9x = 18$
 $\div 9$ $\div 9$
 $x = 2$

$3x + 2y = 16$
 $3(2) + 2(y) = 16$
 $6 + 2y = 16$
 -6 -6
 $2y = 10$
 $y = 5$

Solve by subtraction

$3x + 2y = 18$
 $- (x + 2y = 10)$

$2x = 8$
 $\div 2$ $\div 2$
 $x = 4$

$x + 2y = 10$
 $(4) + 2y = 10$
 -4 -4
 $2y = 6$
 $\div 2$ $\div 2$
 $y = 3$

Solve by adjusting both

$2x + 3y = 39$
 $5x - 2y = -7$

Use LCM to make equivalent x OR y values. Because of the negative values using zero pairs and y values is chosen choice.

$4x + 6y = 78$
 $15x - 6y = -21$

Now solve by addition

Addition makes zero pairs

Solutions on a number line

● Includes the value it sits above
○ Does NOT include the value it sits above

Values less than or equal to 3 but also more than -1

$-1 < x \leq 3$

This includes the integer values 0, 1, 2, 3

