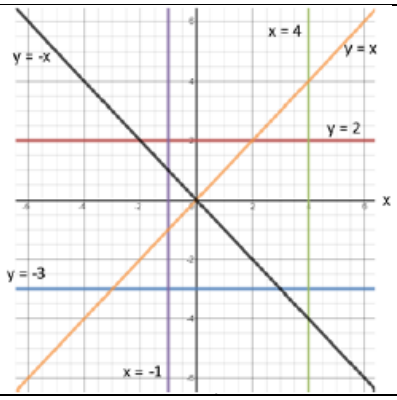
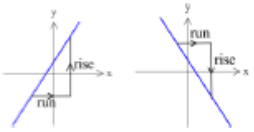
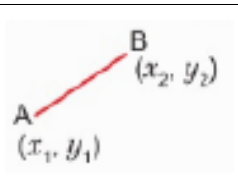
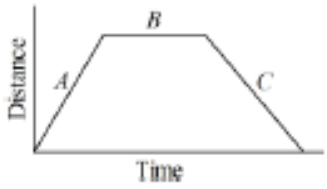
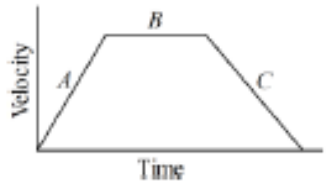
Year 10 Mathematics Foundation HT 1

Graphs - definitions

1.	Axis	A reference line on a graph	
2.	Axes	Plural of axis	
3.	Quadrant	A quarter of a graph separated by a axes	
4.	Coordinate	Used to show a position on a coordinate plane, (x, y)	
		First coordinate is the horizontal position, (x axis) and the second is the vertical position (y axis)	
5.	Origin	The point (0,0) on a set of axes	
6.	Plot	Mark a position or positions on a graph	
7.	y intercept	The y value where a graph crosses the y axis	where x=0
8.	x intercept	The x value where a graph crosses the x axis	where y=0
9.	Parallel	Lines that are equal distance apart that if extended will never meet	
10.	"y=" graph	Constant y coordinate	
		Will be parallel to the x axis	
11.	"x=" graph	Constant x coordinate	
		Will be parallel to the y axis	
12.	Linear function	An arithmetic sequence that can be represented by a straight line graph	
13.	Linear equation	An equation that produces a straight line graph	
14.	$y = mx = c$	The general equation of a straight line	m = gradient and c = y intercept

Linear graphs

15.	Gradient	The steepness of a graph	 This has a positive gradient This has a negative gradient
		$Gradient = \frac{change\ in\ y}{change\ in\ x} = \frac{rise}{run}$	

16.	Gradient between two points	If A = (x_1, y_1) and B = (x_2, y_2) The gradient of line AB = $\frac{y_2-y_1}{x_2-x_1}$	
17.	Parallel lines	Have the same gradients	
18.	Mid-point	The coordinate half way between two point	If A = (x_1, y_1) and B = (x_2, y_2) the mid-point is $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$
Real life graphs			
19.	Steady speed	Travelling the same distance each minute	
20.	Velocity	Speed in a particular direction	
21.	Rate of change	Shows how a variable changes over time	
22.	Acceleration	How fast velocity changes; measured in m/s^2 or km/s^2 etc	
Distance - Time graphs			
23.	Represent a journey		 A = steady speed, B = no movement, C = steady speed back to start
24.	Vertical axis represents the distance from the starting point		
25.	Horizontal axis represents the time taken		
26.	Straight lines mean constant speed		
27.	Horizontal lines mean no movement		
28.	Gradient = speed		
29.	Average speed = $\frac{total\ distance}{total\ time}$		
Velocity – Time graphs			
30.	Represents the speed at given times		 A = steady acceleration, B = constant speed, C = steady deceleration back to a stop
31.	Straight lines mean constant acceleration or deceleration		
32.	Horizontal change means no change in velocity e.g. constant speed		
33.	Positive gradient-= acceleration		
34.	Negative gradient = deceleration		
35.	Distance travelled = area under the graph		

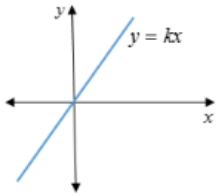
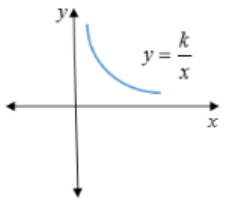
Transformations - definitions					
1.	Transformation	Changing a 2D shape in some way.			
		Rotation	Reflection	Translation	Enlargement
2.	Object	The name given to a shape before a transformation has occurred.			
3.	Image	The name given to a shape after a transformation has occurred			
4.	Rotation	A circular movement about a fixed point			
5.	Centre of rotation	The fixed point that the shape has been rotated about			
		Written as a coordinate (x, y)			
6.	Direction	Clockwise or anticlockwise			
7.	Reflection	An image as it would be seen in a mirror			
8.	Line of reflection	The "mirror line" used to perform reflections.			
		Written using algebraic notation e.g. $y = 3$, $x = -2$, $y = x$ or x/y axis			
9.	Translation	The movement of a shape without rotating or flipping it			
10.	Column vector	Notation used to represent translations		$\begin{pmatrix} x \\ y \end{pmatrix}$	
		x is the horizontal movement			
		y is the vertical movement			
11.	Resultant vector	The vector that moves the shape to its final position after more than one translation			
12.	Enlargement	A change in size of a shape (can be bigger or smaller)			
13.	Scale factor	The proportions by which the dimensions of an object will increase/decrease by			
		If fractional then the image will be smaller than the object			
14.	Centre of enlargement	A fixed point to enlarge an object from			
		Written as a coordinate (x, y)			
15.	Single transformation	Where the object is only transformed once			
16.	Combination	Where the object is transformed multiple times			
17..	Origin	The point (0,0); where the x and y axis intersect			
18.	Similar	Same shape but different sizes			
		e.g. similar shapes are enlargements of one another			
19.	Congruent	Shapes that are the same shape and size			
20.	Describe	Use key words to accurately state what has happened to an object to make the resulting image			

Transformations			
21.	Rotation	To carry out you need to: 1. Draw object on tracing paper 2. Place pencil on 'centre of rotation' and carry out the motion 3. Draw your image on the grid	To describe you need to write: a) "rotation" b) angle of rotation c) direction of rotation d) centre of rotation
22.	Reflection	To carry out you need to: 1. If required draw the 'line of reflection' 2. Count squares from object to line and repeat the other side of the line for all corners of the object 3. Join points up to create the image	To describe you need to write: a) "reflection" b) the equation of the line of reflection
23.	Translation	To carry out you need to: 1. Use vector notation to work out the horizontal and vertical movement 2. Count squares to carry out movement on all corners of the object 3. Join up points to create the image	To describe you need to write: a) "translation" b) the column vector
24.	Enlargement	To carry out you need to: 1. If required cross the coordinate that is the centre of enlargement 2. For each corner count from the line of reflection to the object 3. Multiply this movement by the required scale factor 4. Draw new corners from the centre of enlargement with new horizontal and vertical movement 5. Join up points to create image	To describe you need to write: a) "enlargement" b) the scale factor c) the centre of enlargement

Kettering Science Academy Maths

Year 10 Mathematics Foundation HT 2

Ratio and Proportion - definitions

1.	Ratio	A relationship between two or more quantities	
2.	Unit ratio	Used to compare ratios, one of the parts is 1	
		The only time it is permissible to have a decimal in a ratio	
3.	Equivalent	Ratios that have the same simplified form are said to be equivalent	
4.	Scale	A ratio that represents the relationship between a length on a drawing or a map and the actual length	
5.	Proportion	Compares a part with a whole	
6.	Direct proportion	Two quantities increase at the same rate	$y \propto x$ $y = kx$ for a constant k
		Graph is a straight line that goes through the origin	
7.	Inverse/indirect proportion	One variable increases at a constant rate as the second variable decreases	$y \propto \frac{1}{x}$ $y = \frac{k}{x}$ for a constant k 
8.	Proportional	A change in one is always accompanied by a change in the other	
9.	Constant of proportionality	Represented by *k*	
		Its value stays the same	
10.	Share	Splitting into parts as defined by a ratio	
11.	Unitary method	Finding the value of 1 item then using this to find the value of any number of that item	

		Use to work out which products give the best value for money	
Working with ratios			
12.	Simplifying ratio	Divide all parts by the highest common factor All parts in the simplified version must be integers	e.g. 12:4 simplifies to 3:1 (divided by HCF of 4)
13.	Divide in a given ratio	Divide an amount so the ratio of the final values simplifies to the given ratio	