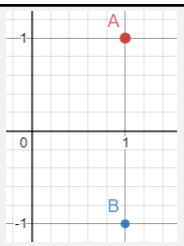
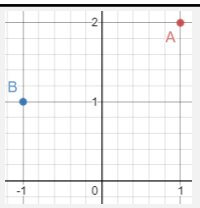
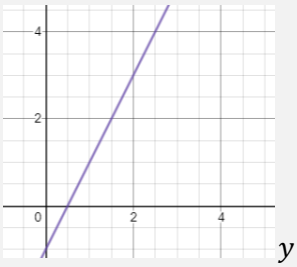
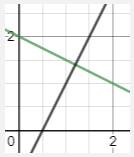
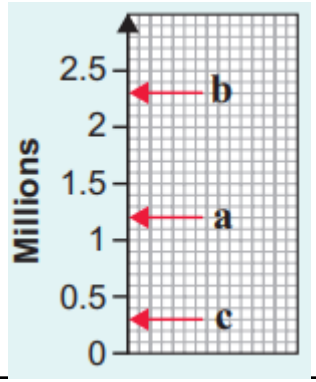
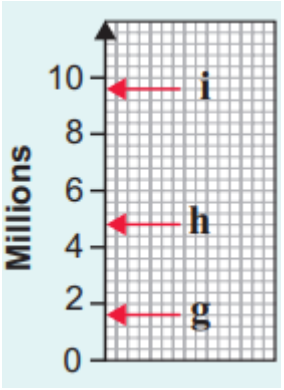
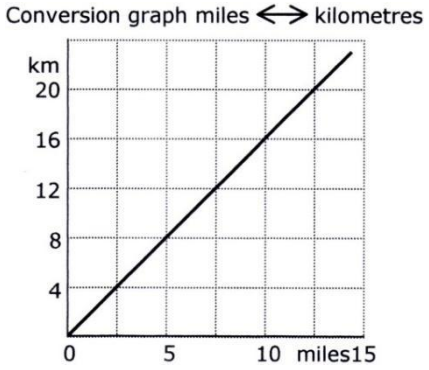
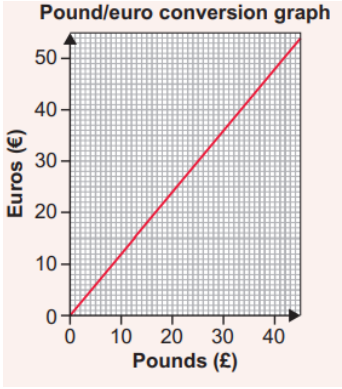
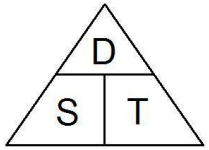
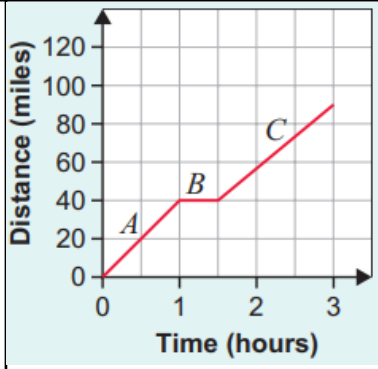
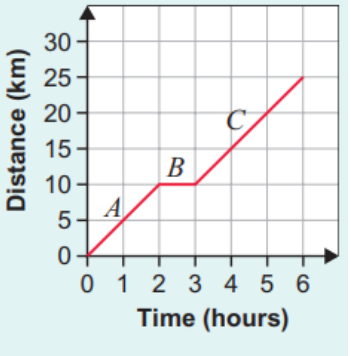
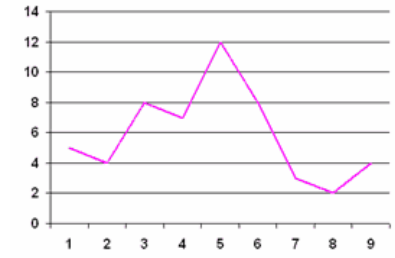
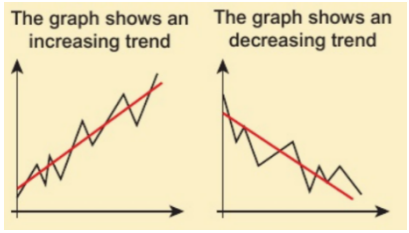
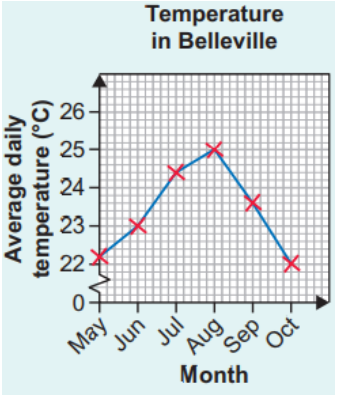
GCSE Mathematics – Unit 9: Graphs **Name:……**

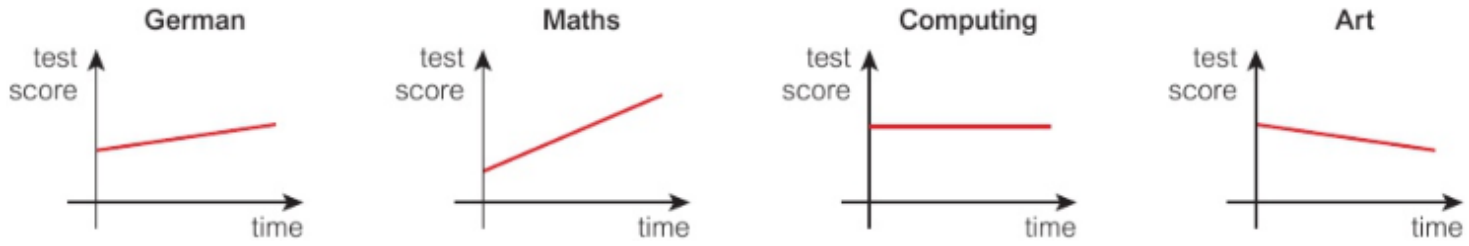
Topic/Skill	Definition/Tips	Example	Your Turn
Co-ordinates	Co-ordinates are written (x, y) 'Along the corridor and up the stairs'	 Write the co-ordinates: A: (1 , 1) B: (1 , -1)	 Write the co-ordinates: A: (,) B: (,)
Midpoint of a Line	The point that is exactly half-way in between two other points. Method 1: add the x coordinates and divide by 2, then the y coordinates	Find the midpoint between (2,1) and (6,9) $\frac{2+6}{2} = 4$ and $\frac{1+9}{2} = 5$ So, the midpoint is (4,5)	Find the midpoint between (3,-1) and (5,9)
Straight Line Graph	The normal equation of a linear graph is $y = mx + c$ where m **is the gradient** and c **is the y-intercept**. The **equation** can look different; if **m or c** are zero, or if the equation has been **rearranged**	 $y = 2x - 1$ Different examples: $x = y$ $y = 4$ $x = -2$ $y + x = 10$ $2y - 4x = 12$	a) For $y = 3x - 1$ The gradient is: The y-intercept is: b) For $y = -2x + 1$ The gradient is: The y-intercept is: c) For $2x + 2y = 10$ The gradient is: The y-intercept is:
Plotting Straight Line Graphs	Method : **Table of Values** Construct a table of values to calculate coordinates.	Find some coordinates of the line $y = x + 3$ x: -3 -2 -1 0 1 2 3 y= x +3: 0 1 2 3 4 5 6	Find some coordinates of the line $y = 2x + 1$ x: 1 2 $y = 2x + 1$:
Parallel Lines	Parallel lines have the same gradient 	The lines $y = 4x + 2$ and $y = 4x - 1$ are parallel because they have the same gradient	Tick the two lines that are parallel: $y = x - 1$ $y = 2x - 1$ $y = x + 3$

Perpendicular Lines 	Perpendicular lines meet at 90 °. Their gradients will be the negative reciprocal of each other	The lines $y = 2x + 2$ and $y = -\frac{1}{2}x - 1$ are perpendicular because their gradients are the negative reciprocal	Tick the two lines that are perpendicular: $y = 3x - 3$ $y = -3x - 1$ $y = -\frac{1}{3}x + 2$

Real Life Graphs

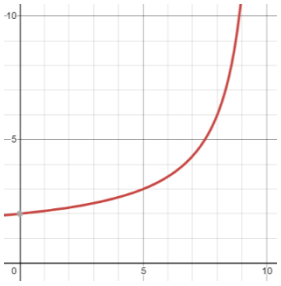
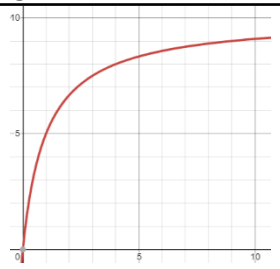
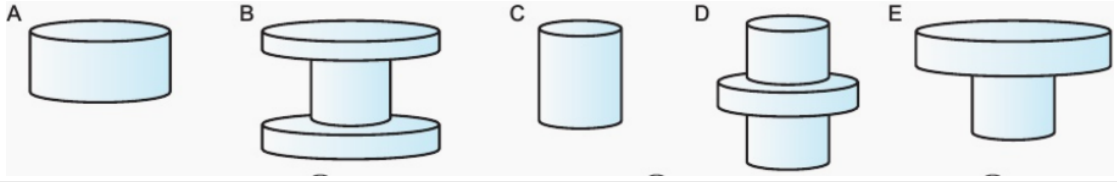
Topic/Skill	Definition/Tips	Example	Your Turn
Scale	The most important skill for understanding graphs is reading a scale. You need to read the label of the axis to know if you're counting in units or 1000s or millions. Then you need to count **how many little lines** there are between each number to work out how much **each little step is.**	There are 5 little lines in between each 0.5 on the scale, so each little line is $0.5 \div 5 = 0.1$ So  **a = 1.2 Million** **b = 2.3 Million** **c = 0.3 Million**	
Conversion Graph	A line graph to **convert one unit to another**. Can be used to convert units (eg. miles and kilometres) or currencies ($ and £) Find the value you know on one axis, read up/across to the conversion line and read the equivalent value from the other axis.	 $8\ km = 5\ miles$	 How many Euros is £40?
Speed, Distance, Time	**Speed = Distance ÷ Time** **Distance = Speed x Time** **Time = Distance ÷ Speed**	Speed = 4mph Time = 2 hours	Speed = 60mph Time = 3 hours Find the Distance

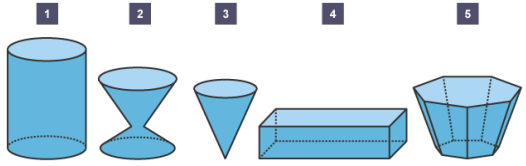
	 Remember the correct units.	Find the Distance. $D = S \times T = 4 \times 2 = 8\,miles$	Distance = 100km Time = 2 hours Find the Speed
Distance-Time Graphs	You can find the **speed** from the **gradient** of the line (Distance ÷ Time) The steeper the line, the quicker the speed. A **horizontal** line (like part **B** on the example) means the object is not moving (**stationary**).	 In Part A of the journey, the distance travelled was 40 miles and the time was 1 hour. $40 \div 1 = 40$ The speed was 40mph.	 Speed in Part A: B: C:
Line Graph	A graph that uses **points connected by straight lines** to show how data changes in values. This can be used for **time series data**, which is a series of data points spaced over uniform time intervals in **time order.** Line graphs can help you identify **trends** in the data. The trend is the general direction of change, ignoring individual ups and downs.	 	 What does this graph tell you about the temperature in Belleville?
	Here are one class's changing test scores in different subjects over a year.		

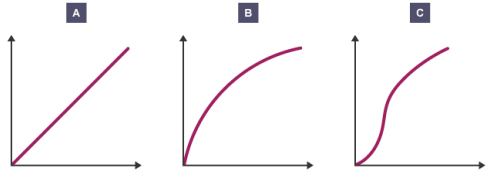


In which subject are test score…

a) Falling? b) Increasing the fastest? c) Staying the same?

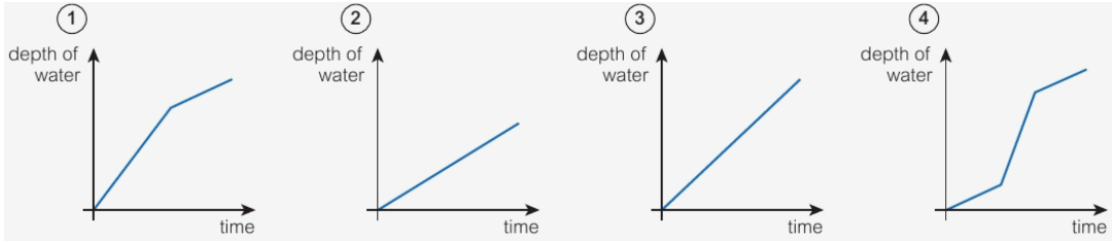
Curves on Line Graphs	If there is a curve on a line graph it means that something is changing at a **changing rate.** This graph is **increasing at an increasing rate**. It could represent a car **accelerating** faster and faster **away** from the starting point. 	 **point.** **starting point.**	This graph is **increasing at a decreasing rate**. It could represent a car driver hitting the brakes and slowing down. **It is still moving away from the starting** This graph is **decreasing at an increasing rate**. It could represent a car **accelerating** faster and faster **back to the**	 This graph is… It could represent…
Depth of Water in Containers	Graphs can be used to show how the depth of water changes as different shaped containers are filled with water at a constant rate.			





Graph A fits Container 1 because it fills up at one speed that doesn't change.

Graph B fits Container 3 because it fills more slowly as the container gets wider.



Can you match the graphs to the shape of container?
Try to explain each answer.

1)	2)
3)	4)