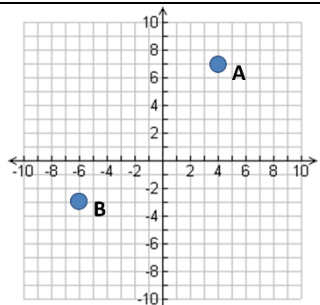
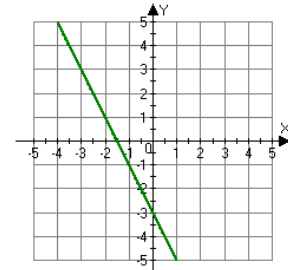
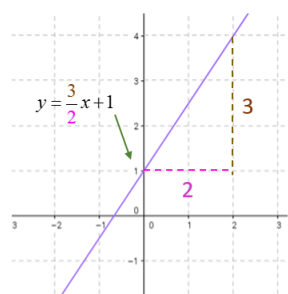
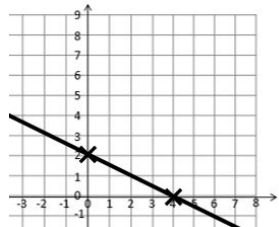
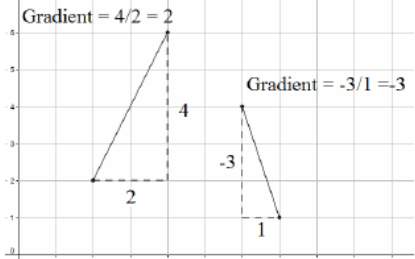
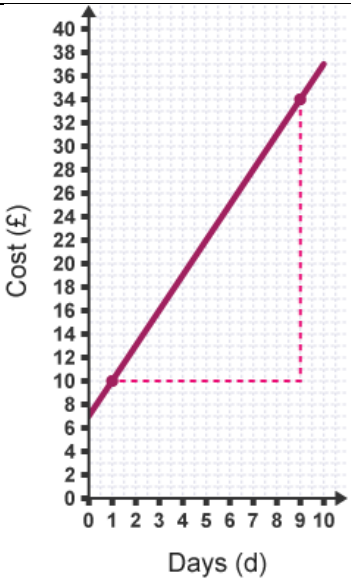


Topic: Coordinates and Graphs

Topic/Skill	Definition/Tips	Example																
Coordinates	Written in pairs . The first term is the x-coordinate (movement across). The second term is the y-coordinate (movement up or down)	 A: (4,7) B: (-6,-3)																
Midpoint of a Line	Method 1: add the x coordinates and divide by 2, add the y coordinates and divide by 2 Method 2: Sketch the line and find the values half way between the two x and two y values.	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)																
Linear Graph	Straight line graph. The general equation of a linear graph is $y = mx + c$ where m is the gradient and c is the y-intercept . The equation of a linear graph can contain an x-term , a y-term and a number .	Example:  Other examples: $x = y$ $y = 4$ $x = -2$ $y = 2x - 7$ $y + x = 10$ $2y - 4x = 12$																
Plotting Linear Graphs	Method 1: Table of Values Construct a table of values to calculate coordinates. Method 2: Gradient-Intercept Method (use when the equation is in the form $y = mx + c$) 1. Plots the y-intercept 2. Using the gradient, plot a second point. 3. Draw a line through the two points plotted. Method 3: Cover-Up Method (use when the equation is in the form $ax + by = c$) 1. Cover the x term and solve the resulting equation. Plot this on the $x - axis$. 2. Cover the y term and solve the resulting equation. Plot this on the $y - axis$. 3. Draw a line through the two points plotted.	<table border="1" data-bbox="978 1084 1434 1196"><tr><td>x</td><td>-3</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y = x + 3</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>  	x	-3	-2	-1	0	1	2	3	y = x + 3	0	1	2	3	4	5	6
x	-3	-2	-1	0	1	2	3											
y = x + 3	0	1	2	3	4	5	6											
Gradient	The gradient of a line is how steep it is. Gradient = $\frac{\text{Change in } y}{\text{Change in } x} = \frac{\text{Rise}}{\text{Run}}$ The gradient can be positive (sloping upwards) or negative (sloping downwards)																	

Finding the Equation of a Line <u>given a point and a gradient</u>	Substitute in the gradient (m) and point (x,y) in to the equation $y = mx + c$ and solve for c .	Find the equation of the line with gradient 4 passing through (2,7). $y = mx + c$ $7 = 4 \times 2 + c$ $c = -1$ $y = 4x - 1$
Finding the Equation of a Line <u>given two points</u>	Use the two points to calculate the gradient . Then repeat the method above using the gradient and either of the points.	Find the equation of the line passing through (6,11) and (2,3) $m = \frac{11 - 3}{6 - 2} = 2$ $y = mx + c$ $11 = 2 \times 6 + c$ $c = -1$ $y = 2x - 1$
Parallel Lines	If two lines are parallel , they will have the same gradient . The value of m will be the same for both lines.	Are the lines $y = 3x - 1$ and $2y - 6x + 10 = 0$ parallel? Answer: Rearrange the second equation in to the form $y = mx + c$ $2y - 6x + 10 = 0 \rightarrow y = 3x - 5$ Since the two gradients are equal (3), the lines are parallel.
Real Life Graphs	Graphs that are supposed to model some real-life situation. The actual meaning of the values depends on the labels and units on each axis. The gradient might have a contextual meaning. The y-intercept might have a contextual meaning. The area under the graph might have a contextual meaning.	 A graph showing the cost of hiring a ladder for various numbers of days. The gradient shows the cost per day. It costs £3/day to hire the ladder.

		The y-intercept shows the additional cost/deposit/fixed charge (something not linked to how long the ladder is hired for). The additional cost is £7.
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.	Conversion graph miles ↔ kilometres 8 km = 5 miles
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.	
Rate of Change	The rate of change at a particular instant in time is represented by the gradient of the tangent to the curve at that point.	
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 means the object is not moving (stationary).	