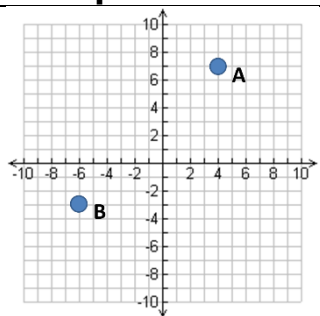
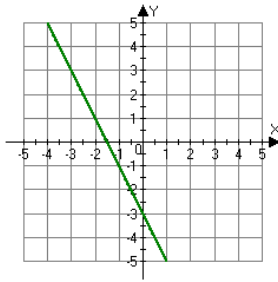
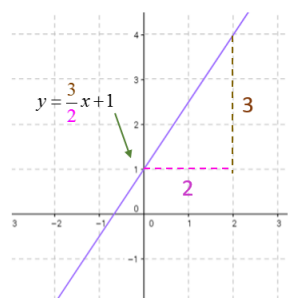
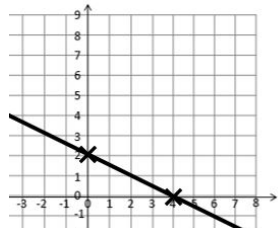
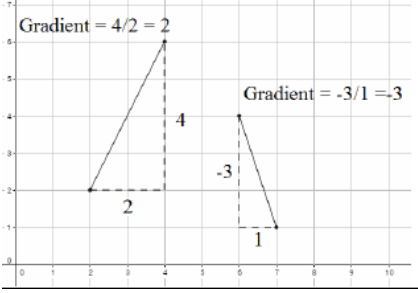


Topic: Coordinates and Linear Graphs

Topic/Skill	Definition/Tips	Example																
1. Coordinates	Written in pairs . The first term is the x-coordinate (movement across). The second term is the y-coordinate (movement up or down)	 <p>A: (4,7) B: (-6,-3)</p>																
2. 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)																
3. 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:  <p>Other examples: $x = y$ $y = 4$ $x = -2$ $y = 2x - 7$ $y + x = 10$ $2y - 4x = 12$</p>																
4. 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 $ax + by = c$)	<table><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>   <p>$2x + 4y = 8$</p>	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											



	<p>1. Cover the x term and solve the resulting equation. Plot this on the x – axis.</p> <p>2. Cover the y term and solve the resulting equation. Plot this on the y – axis.</p> <p>3. Draw a line through the two points plotted.</p>	
5. Gradient	<p>The gradient of a line is how steep it is.</p> <p>Gradient = $\frac{\text{Change in } y}{\text{Change in } x} = \frac{\text{Rise}}{\text{Run}}$</p> <p>The gradient can be positive (sloping upwards) or negative (sloping downwards)</p>	
6. Finding the Equation of a Line <u>given a point and a gradient</u>	<p>Substitute in the gradient (m) and point (x,y) in to the equation $y = mx + c$ and solve for c.</p>	<p>Find the equation of the line with gradient 4 passing through (2,7).</p> $y = mx + c$ $7 = 4 \times 2 + c$ $c = -1$ $y = 4x - 1$
7. Finding the Equation of a Line <u>given two points</u>	<p>Use the two points to calculate the gradient. Then repeat the method above using the gradient and either of the points.</p>	<p>Find the equation of the line passing through (6,11) and (2,3)</p> $m = \frac{11 - 3}{6 - 2} = 2$ $y = mx + c$ $11 = 2 \times 6 + c$ $c = -1$ $y = 2x - 1$
8. Parallel Lines	<p>If two lines are parallel, they will have the same gradient. The value of m will be the same for both lines.</p>	<p>Are the lines $y = 3x - 1$ and $2y - 6x + 10 = 0$ parallel?</p> <p>Answer: Rearrange the second equation in to the form $y = mx + c$</p> $2y - 6x + 10 = 0 \rightarrow y = 3x - 5$ <p>Since the two gradients are equal (3), the lines are parallel.</p>



<p>9. Perpendicular Lines</p>	<p>If two lines are perpendicular, the product of their gradients will always equal -1. The gradient of one line will be the negative reciprocal of the gradient of the other line.</p> <p>You may need to rearrange equations of lines to compare gradients (they need to be in the form $y = mx + c$)</p>	<p>Find the equation of the line perpendicular to $y = 3x + 2$ which passes through (6,5)</p> <p>Answer: As they are perpendicular, the gradient of the new line will be $-\frac{1}{3}$ as this is the negative reciprocal of 3.</p> $y = mx + c$ $5 = -\frac{1}{3} \times 6 + c$ $c = 7$ $y = -\frac{1}{3}x + 7$ <p>Or</p> $3x + x - 7 = 0$

