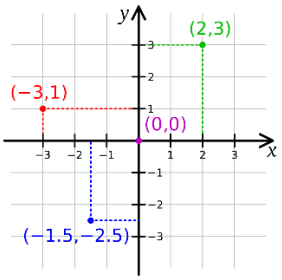
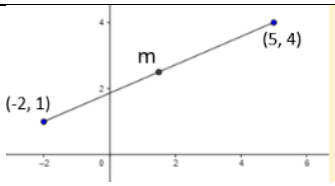
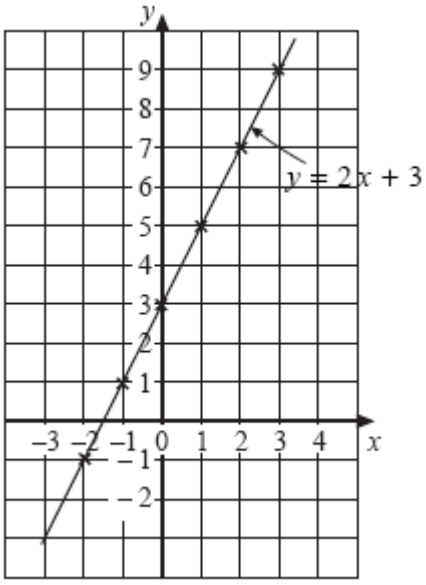
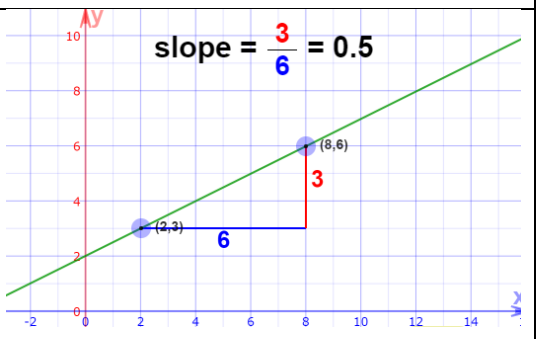
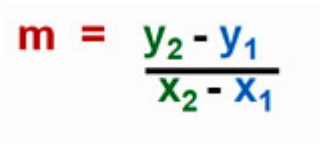
Year 9 Strand 1

Topic/Skill	Definition/Tips	Example
1. Coordinates	Coordinates are written in the form (x,y). This can be remembered as "along the corridor and up the stairs." Negative coordinates represent movement left and down on the horizontal and vertical axes	
2. Mid points of a line segment	The midpoint between a pair of coordinates or on a line can be visualised as the centre of the line. The midpoint between two points (x_1 , y_1) and (x_2 , y_2) can also be calculated using the formula… $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$	 $m=\left(\frac{-2+5}{2}, \frac{1+4}{2}\right)$ $=\left(\frac{3}{2}, \frac{5}{2}\right)$ $=(1.5, 2.5)$
3. Plotting a straight line graph	A straight line graph can be plotted from an equation given in terms of x and y. The equation is a rule that changes the x-coordinate into the y-coordinate. This rule can be represented as a function machine. E.g. y = 2x + 3 x → x2 → +3 → y	<table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y</td><td>-1</td><td>1</td><td>3</td><td>5</td><td>7</td><td>9</td></tr></table> 3 x 2 + 3 = 9 
4. Gradient and intercept of straight line	The gradient of a line can be calculated by counting how squares the line moves up/down and dividing by how many squares it moves across.	

Year 9 Strand 1

	The gradient of a line can also be calculated between two coordinates using the following formula.  $m = \frac{y_2 - y_1}{x_2 - x_1}$ The y-intercept is the point at which the line crosses the y-axis	We need to find the GRADIENT between A at (3,-2) and B at (-3,4) $m = \frac{y_2 - y_1}{x_2 - x_1}$ $m = \frac{4 - -2}{-3 - 3}$ $m = 6 / -6 = -1$ ✓
5. Calculate quantities in direct and inverse proportion	Quantities can be in direct proportion, meaning, when one doubles the other doubles. $y \propto x$ means that $y = kx$ for some constant k There are also other types of proportion including inverse proportion where if one quantity doubles the other halves	Y is directly proportional to the square of x. When y = 100, x = 25. Calculate y when x = 4. $y = kx^2$ $100 = k \times 5^2$ Hence k = 4 and $y = 4x^2$ When x = 4 $y = 4 \times 4^2 = 64$
6. Convert numbers to and from standard form	Standard form is a way of writing very large and very small numbers. The first number needs to be between 1 and 10 (excluding 10) 3.5×10^6 means 3.5 multiplied by 10 six times. 3.5×10^{-6} means 3.5 divided by 10 six times.	$3.5 \times 10^6 = 3500000$ Move the numbers left across the decimal point by the value of the index number (add a zero every time a gap is created) $3.5 \times 10^{-6} = 0.0000035$ Move the numbers right across the decimal point by the value of the index number (add a zero every time a gap is created)
7. Calculate using standard form with and without a calculator	Calculating with standard form is frequently simpler than calculating use large or small numbers. Number can be multiplied or divided by multiplying or dividing the front numbers then applying index laws to the indices.	$2 \times 10^3 \times 3 \times 10^6$ $= 2 \times 3 \times 10^3 \times 10^6$ $= 6 \times 10^{3+6}$ $= 6 \times 10^9$