Topics	What students need to learn:		
		Content	**Guidance**
3 **Coordinate geometry in the (x,y) plane**	3.1	**Understand and use the equation of a straight line, including the forms $y - y_1 = m(x - x_1)$ and $ax + by + c = 0$;**	**To include the equation of a line through two given points, and the equation of a line parallel (or perpendicular) to a given line through a given point.**
		Gradient conditions for two straight lines to be parallel or perpendicular.	**$m' = m$ for parallel lines and $m' = -\frac{1}{m}$ for perpendicular lines**
		Be able to use straight line models in a variety of contexts.	**For example, the line for converting degrees Celsius to degrees Fahrenheit, distance against time for constant speed, etc.**
	3.2	**Understand and use the coordinate geometry of the circle including using the equation of a circle in the form $(x - a)^2 + (y - b)^2 = r^2$**	**Students should be able to find the radius and the coordinates of the centre of the circle given the equation of the circle, and vice versa.** **Students should also be familiar with the equation $x^2 + y^2 + 2fx + 2gy + c = 0$**
		Completing the square to find the centre and radius of a circle; use of the following properties:	
		• **the angle in a semicircle is a right angle** • **the perpendicular from the centre to a chord bisects the chord**	**Students should be able to find the equation of a circumcircle of a triangle with given vertices using these properties.**
		• **the radius of a circle at a given point on its circumference is perpendicular to the tangent to the circle at that point.**	**Students should be able to find the equation of a tangent at a specified point, using the perpendicular property of tangent and radius.**

Topics	What students need to learn:		
	Content		Guidance
3 **Coordinate geometry in the (x, y) plane** *continued*	3.3	Understand and use the parametric equations of curves and conversion between Cartesian and parametric forms.	For example: $x = 3\cos t,\ y = 3\sin t$ describes a circle centre O radius 3 $x = 2 + 5\cos t,\ y = -4 + 5\sin t$ describes a circle centre $(2, -4)$ with radius 5 $x = 5t,\ y = \frac{5}{t}$ 5describes the curve $xy = 25$ (or $y = \frac{25}{x}$) $x = 5t, y = 3t^2$ describes the quadratic curve $25y = 3x^2$ and other familiar curves covered in the specification. Students should pay particular attention to the domain of the parameter t, as a specific section of a curve may be described.
	3.4	Use parametric equations in modelling in a variety of contexts.	A shape may be modelled using parametric equations or students may be asked to find parametric equations for a motion. For example, an object moves with constant velocity from $(1, 8)$ at $t = 0$ to $(6, 20)$ at $t = 5$. This may also be tested in Paper 3, section 7 (kinematics).