

YEAR 11 — NON-LINEAR GRAPHS

By the end of this unit you should be able to:	MathsWatch clip	Video tutorial
• Plot & read from quadratic graphs	98	Corbett
• Plot & read from cubic graphs	161	MathsGenie
• Plot & read from reciprocal graphs	161	MathsGenie
• Recognise graph shapes		
• Identify & interpret roots & intercepts of quadratics	160	
• Understand & use exponential graphs (H)	194	Corbett
• Find and use the equation of a circle centre (0,0) (H)	197	Corbett
• Find the equation of the tangent to any curve (H)	208	Corbett



Keywords

Quadratic: an expression in which the highest power is 2, such as $x^2 - 5x + 3$

Cubic: an expression in which the highest power is 3, such as $8 + x^3$

Estimate: read approximate values from a graph

Asymptote: a line that a curve approaches, but never quite touches

Gradient: the steepness (or slope) of a line. A negative gradient means the line slopes downhill

Substitute: put numbers in place of letters to find the value of an expression

Reciprocal: a graph with an equation of the form $y = \frac{k}{x}$ where k is a number

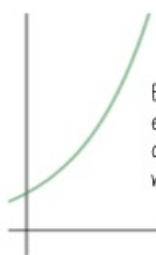
Roots: the solutions when an equation equals zero (often the x -intercepts of a graph)

Exponential: a graph with an equation of the form $y = k^x$ where k is a number

Tangent: a straight line touching a curve which can be used to estimate the gradient of the curve at that point

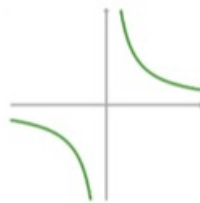
Some (but not all)
key points:

Exponential graphs are often this shape

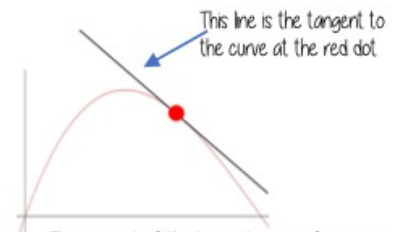


Exponential equations are often of the form $y = k^x$ where k is a number

Reciprocal graphs are often this shape

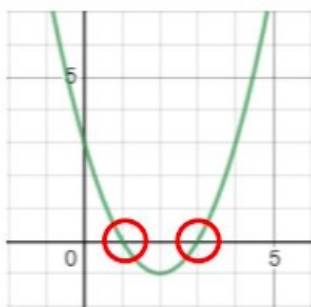


Exponential equations are of the form $y = \frac{k}{x}$ where k is a number



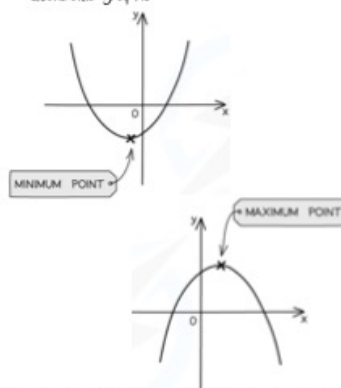
The gradient of the tangent can be found using

$$\frac{\text{change in } y}{\text{change in } x}$$

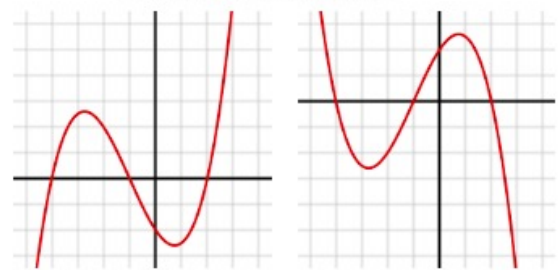


Roots are where the curve crosses the x -axis

Quadratic graphs:



Cubic graphs generally look like these



'Uphill' if the x^3 term is positive, such as $y = 2x^3 - 4x + 8$

'Downhill' if the x^3 term is negative, such as $y = -3x^3 + x^2 + 7$