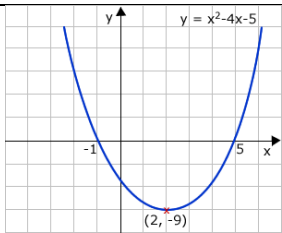
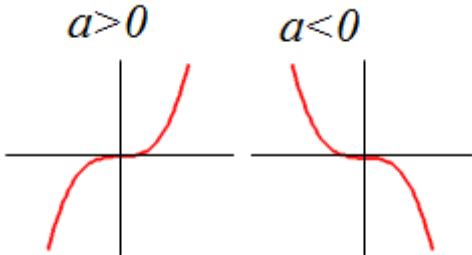
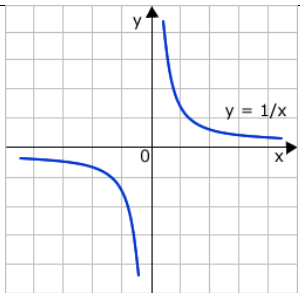
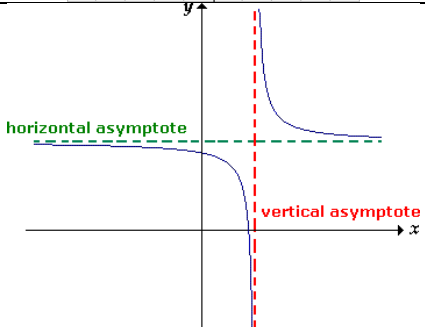
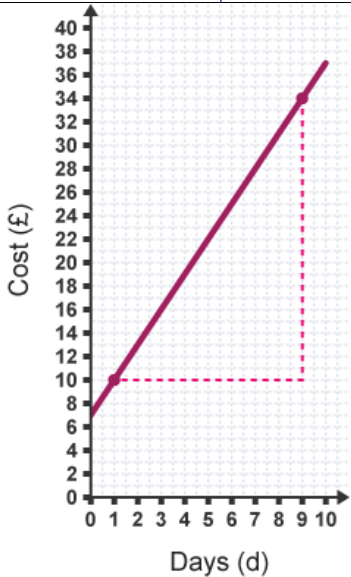
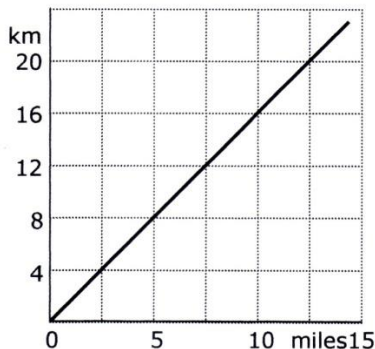
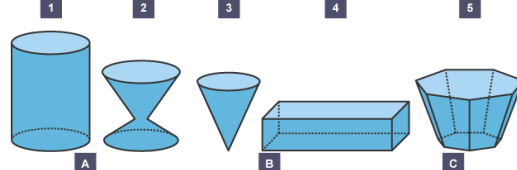
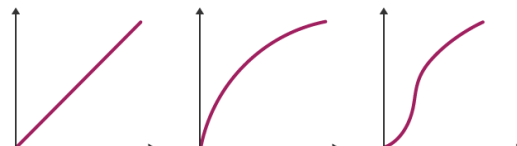
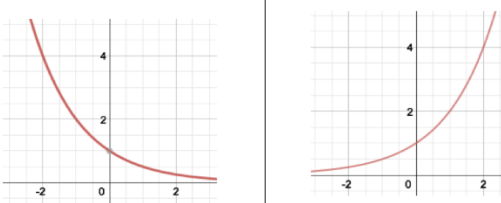
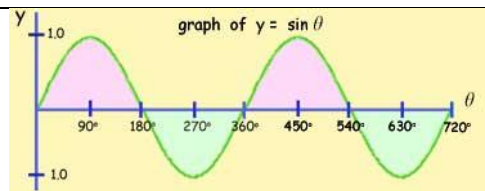
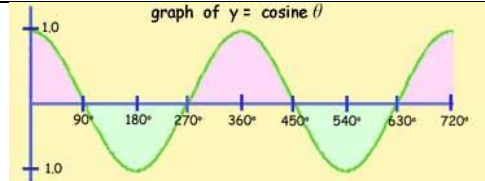
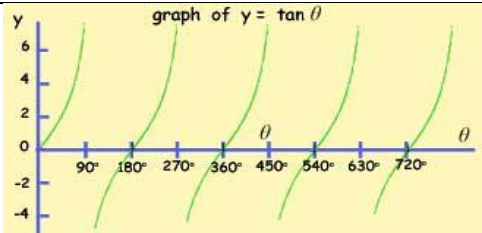
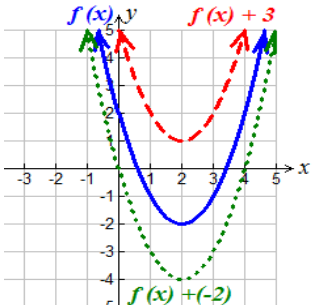
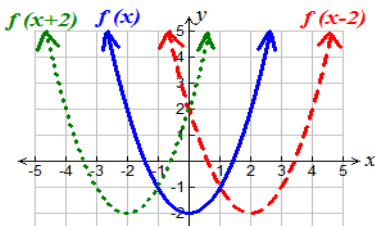
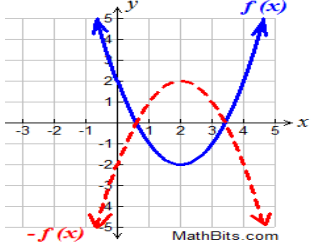
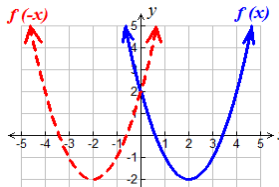
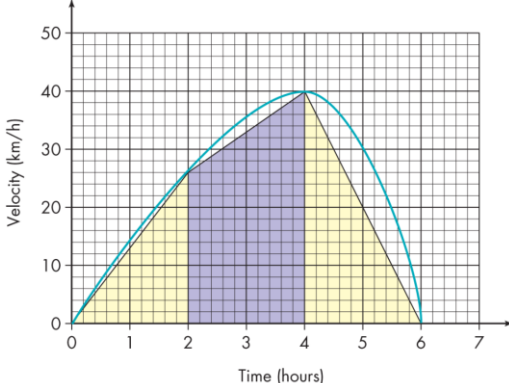
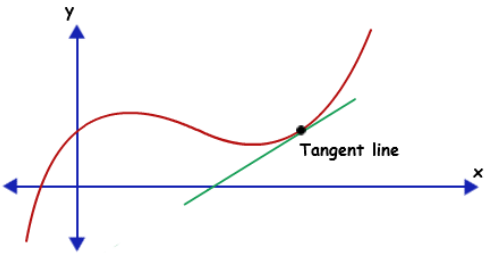
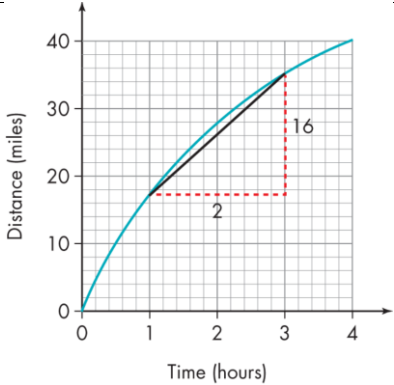
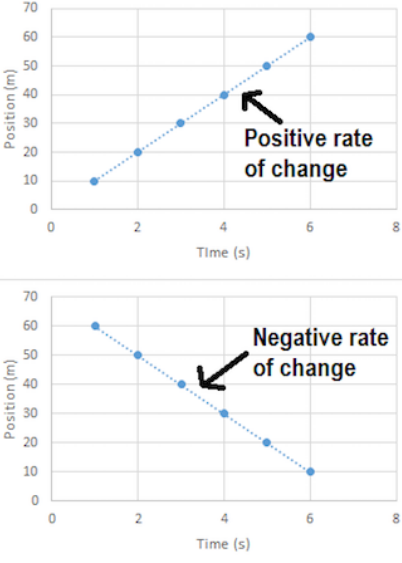
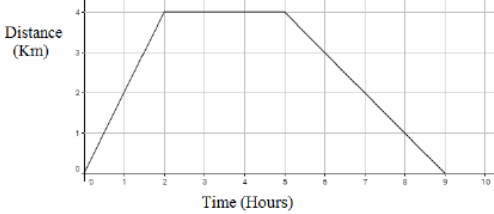


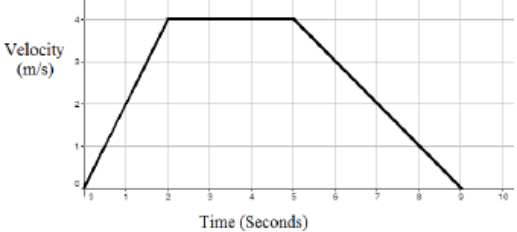
Topic: Graphs 2

Topic/Skill	Definition/Tips	Example
Quadratic Graph	A 'U-shaped' curve called a parabola. The equation is of the form $y = ax^2 + bx + c$, where a, b and c are numbers, $a \neq 0$. If $a < 0$, the parabola is upside down.	
Cubic Graph	The equation is of the form $y = ax^3 + k$, where k is an number. If $a > 0$, the curve is increasing. If $a < 0$, the curve is decreasing.	
Reciprocal Graph	The equation is of the form $y = \frac{A}{x}$, where A is a number and $x \neq 0$. The graph has asymptotes on the x-axis and y-axis.	
Asymptote	A straight line that a graph approaches but never touches.	
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.	 
Exponential Graph	The equation is of the form $y = a^x$, where a is a number called the base. If $a > 1$ the graph increases. If $0 < a < 1$, the graph decreases. The graph has an asymptote which is the x-axis.	
$y = \sin x$	Key Coordinates: (0, 0), (90, 1), (180, 0), (270, -1), (360, 0) y is never more than 1 or less than -1. Pattern repeats every 360°.	
$y = \cos x$	Key Coordinates: (0, 1), (90, 0), (180, -1), (270, 0), (360, 1) y is never more than 1 or less than -1. Pattern repeats every 360°.	

$y = \tan x$	Key Coordinates: $(0, 0), (45, 1), (135, -1), (180, 0),$ $(225, 1), (315, -1), (360, 0)$ Asymptotes at $x = 90$ and $x = 270$ Pattern repeats every 360°.	
$f(x) + a$	Vertical translation up a units. $\begin{pmatrix} 0 \\ a \end{pmatrix}$	
$f(x + a)$	Horizontal translation left a units. $\begin{pmatrix} -a \\ 0 \end{pmatrix}$	
$-f(x)$	Reflection over the x-axis.	
$f(-x)$	Reflection over the y-axis.	
Area Under a Curve	To find the area under a curve, split it up into simpler shapes – such as rectangles, triangles and trapeziums – that approximate the area.	

Tangent to a Curve	A straight line that touches a curve at exactly one point .	
Gradient of a Curve	The gradient of a curve at a point is the same as the gradient of the tangent at that point. 1. Draw a tangent carefully at the point. 2. Make a right-angled triangle. 3. Use the measurements on the axes to calculate the rise and run (change in y and change in x) 4. Calculate the gradient.	 $\text{Gradient} = \frac{\text{Change in } y}{\text{Change in } x}$ $= \frac{16}{2} = 8$
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).	

Velocity-Time Graphs	You can find the acceleration from the gradient of the line (Change in Velocity $\div$ Time) The steeper the line, the quicker the acceleration. A horizontal line represents no acceleration, meaning a constant velocity. The area under the graph is the distance.	
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Where else is the Graphs topic used: Data handling Ratio and proportion	Links to other subjects: Sciences (Physics, Biology and Chemistry) Humanities (Geography and History)
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