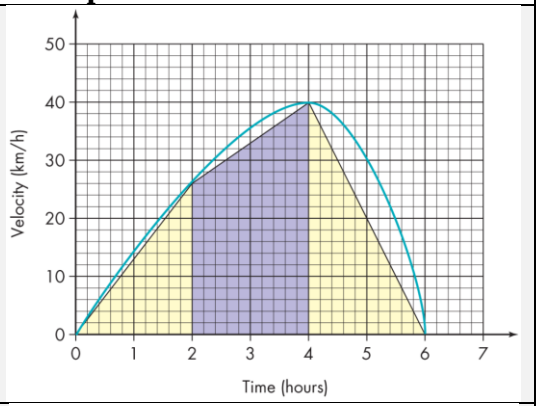
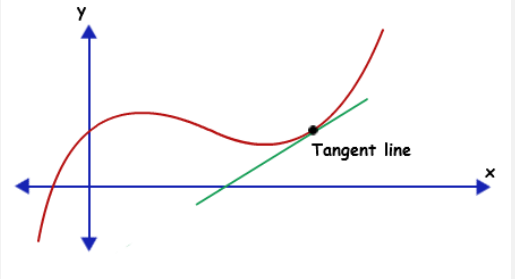
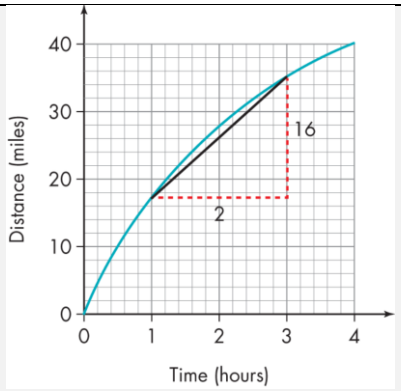
STM Knowledge Organiser Year: 11 Subject: Maths

Core Knowledge

Topic: Area Under Graph and Gradient of Curve

Topic/Skill	Definition/Tips	Example
1. 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.	
2. Tangent to a Curve	A straight **line** that **touches** a curve at **exactly one point**.	
3. 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.	 $Gradient = \frac{Change\ in\ y}{Change\ in\ x}$ $= \frac{16}{2} = 8$

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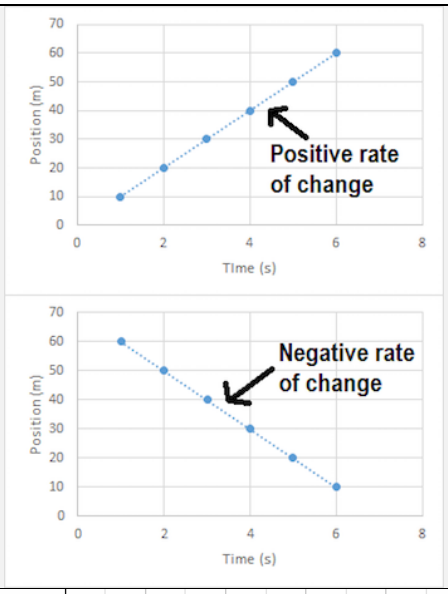
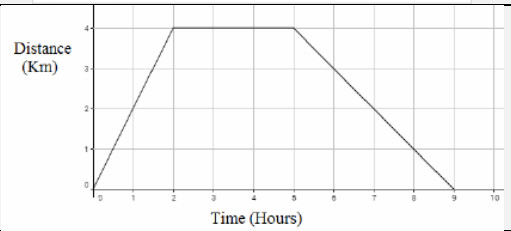
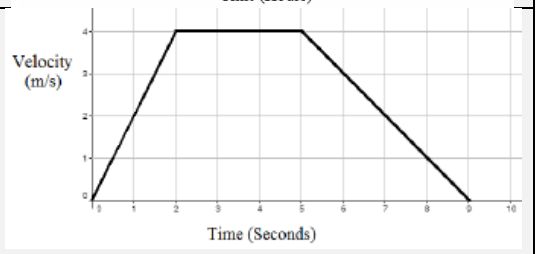
4. Rate of Change	The rate of change at a particular instant in time is represented by the **gradient of the tangent to the curve** at that point.	
5. Distance-Time Graphs	You can find the **speed** from the **gradient** of the line (Distance ÷ Time) The steeper the line, the quicker the speed. A **horizontal** line means the object is not moving (**stationary**).	
6. Velocity-Time Graphs	You can find the **acceleration** from the **gradient** of the line (Change in Velocity ÷ 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.**	

Links to real-life graphs, gradients, areas of shapes, estimation, interpreting information, plotting graphs to represent a real life scenario