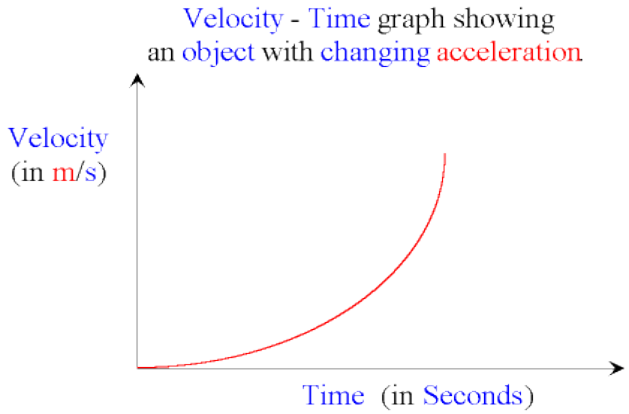
Physics 12
Changing Acceleration

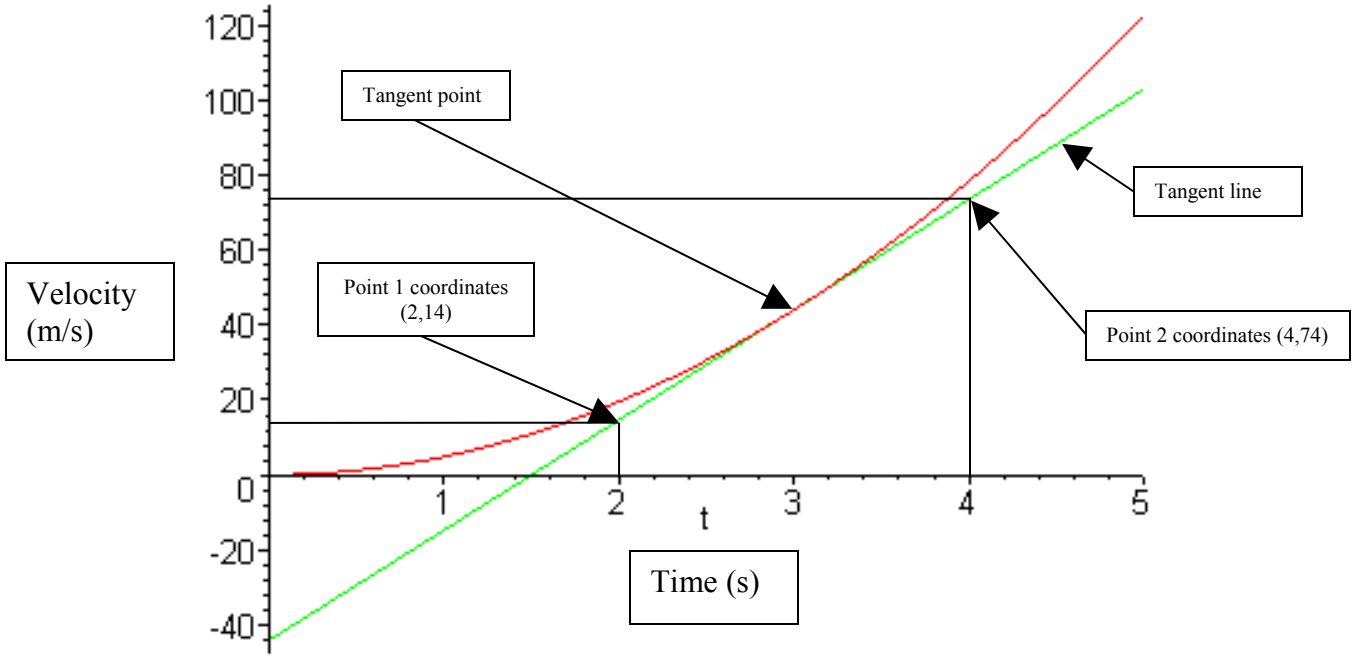
1. The acceleration of an object can change and as a result the object does not have a constant acceleration.



2. The instantaneous acceleration of an object at a given point can be found using the same technique as was used with instantaneous velocity –the slope of the tangent.

3. The slope of the tangent line, at a time of interest, is the instantaneous acceleration of the object at that time.

Velocity versus time graph



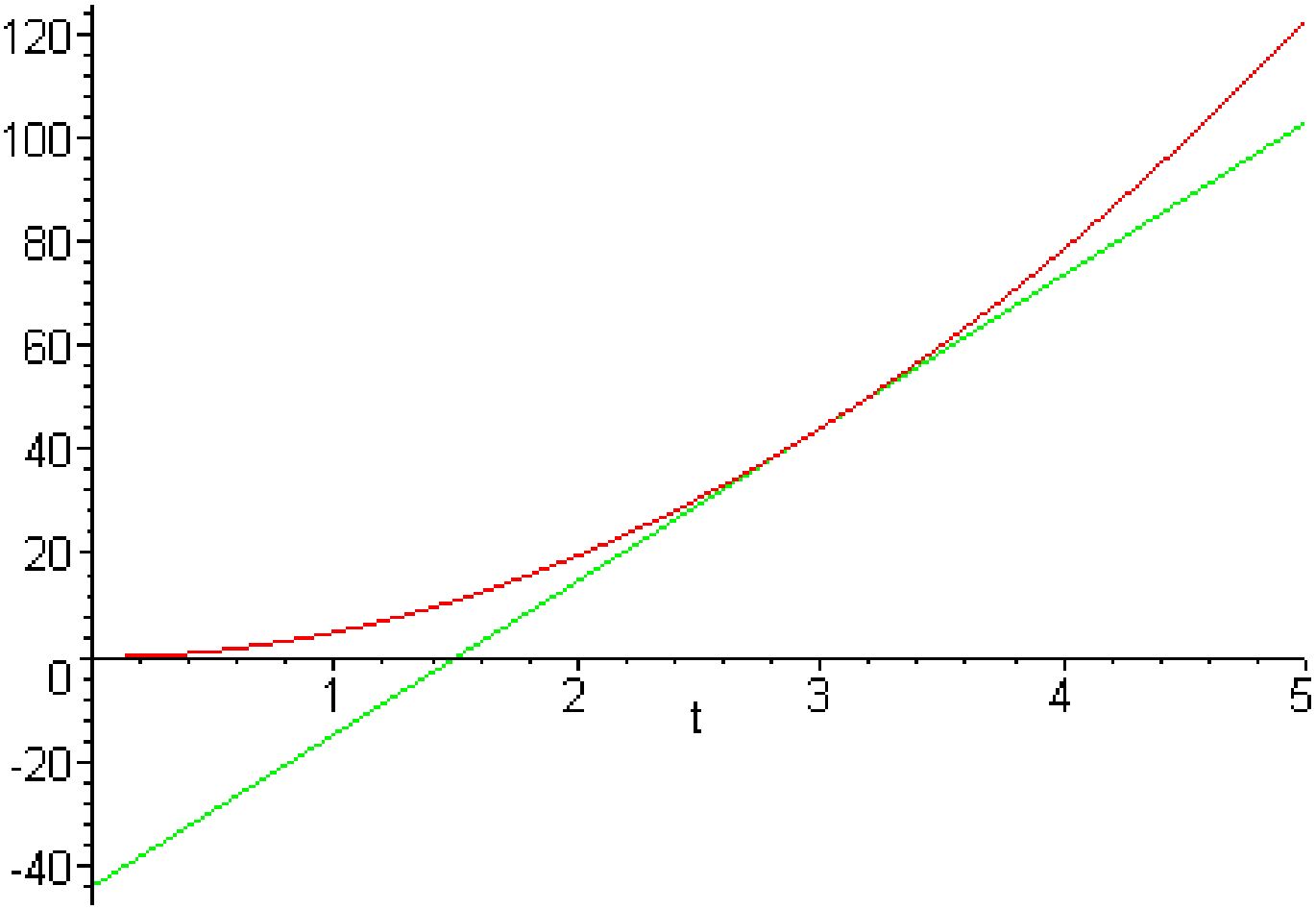
4. The slope of the tangent line in the above graph is:

$$\text{Slope} = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

$$\text{Slope} = \frac{(74 - 14)}{(4 - 2)}$$

$$\text{Slope} = \frac{60}{2} = 30 \text{m/s}^2$$

The Slope of the tangent line at 3s is 30m/s^2. This is the instantaneous acceleration of the object at 3s.



Velocity - Time graph showing
an object with changing acceleration