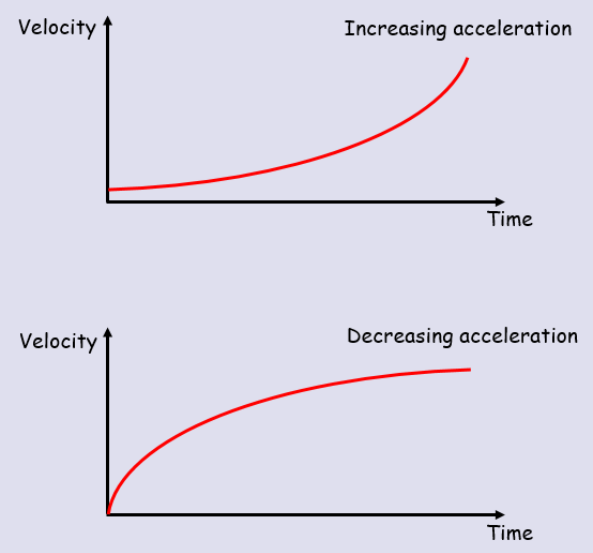
11A Functions of Time



1. A body moves in a straight line, such that its displacement, s metres, from a point O at time t seconds is given by $s = 2t^3 - 3t$ for $t > 0$

a) Find the value of s when $t = 2$

b) Find the time taken for the body to return to O.

2. A toy train travels along a straight track, leaving the start of the track at time $t = 0$. It then returns to the start of the track. The distance, s metres, from the start of the track at time t seconds is modelled by:

   $s = 4t^2 - t^3$ where $0 \leq t \leq 4$

   Explain why there is a time restriction on this model

3. A body moves in a straight line such that its velocity, $v\, ms^{-1}$, at time t seconds is given by:

   $v = 2t^2 - 16t + 24$ for $t \geq 0$

   Find:

a) The initial velocity

b) The values of t when the body is instantaneously at rest

c) The value of t when the velocity is 64ms^{-1}

d) The greatest speed of the body in the interval $0 \leq t \leq 5$