



## Rates of Change – Questions

- Q1) A ball is dropped from a rooftop. The distance the ball has dropped, after  $t$  seconds, is modelled by the function  $h(t) = 5t^2$ . What is the velocity of the ball 3 seconds after being dropped?
- Q2) The velocity of a particle moving in a straight line is given by the function  $v(t) = t - \sqrt{t}$ . Find the acceleration of the particle after 4 seconds.
- Q3) The distance travelled by a train, in metres, after  $t$  seconds, is modelled by the function  $d(t) = 3t^2$ .
- Write an expression for the velocity of the train after  $t$  seconds.
  - What is the velocity of the train after 5 seconds.
  - The acceleration of the train is given by  $\frac{dv}{dt}$ . Find the acceleration.
- Q4) A particle's velocity,  $v \text{ ms}^{-1}$ , after  $t$  seconds is given by the function  $v(t) = 8\sqrt{t}$
- Find the acceleration of the particle after 9 seconds.
  - Find the time for which the acceleration of the particle is  $\frac{9}{16} \text{ ms}^{-2}$ .



## Rates of Change – Solutions

Q1)  $V(3) = 10 \times 3 = 30 \text{ units per second}^{-1}$

Q2)  $A(4) = \frac{3}{4} \text{ units per second}^{-2}$

Q3) a)  $V(t) = d'(t) = 6t$

b)  $V(5) = 6 \times 5 = 30 \text{ ms}^{-1}$

c)  $A(t) = \frac{dv}{dt} = V'(t) = 6 \text{ ms}^{-2}$

Q4) a)  $A(9) = \frac{4}{3} \text{ ms}^{-2}$

b)  $t = 50.5 \text{ seconds}$