

Calculus 12
7-1 Questions

1. If a stone is thrown downward with a speed of 15 m/s from a cliff that is 80 m high, its height in metres after t seconds is $h = 80 - 15t - 4.9t^2$. Find the velocity after 1 s and after 2 s.
2. If a ball is thrown directly upward with an initial velocity of 24.5 m/s, then its height after t seconds, in metres, is $h = 24.5t - 4.9t^2$.
 - a) Find the velocity after 1 s, 2 s, 3 s, and 4 s.
 - b) When does the ball reach its maximum height?
 - c) What is its maximum height?
 - d) When does it hit the ground?
 - e) With what velocity does it hit the ground?
3. The distance travelled by a car is given by $s = 160t^2 + 20t$, where t is measured in hours and s in kilometres. When did the velocity reach 100 km/h?
4. The position function of a particle is $s = t^3 - 3t^2 - 5t$, $t \geq 0$, where t is measured in seconds and s in metres. When does the particle reach a velocity of 4 m/s?
5. The position function of a particle is given by $s = t^2 - 4t + 4$, $t \geq 0$, where t is measured in seconds and s in metres.
 - a) Find the velocity after 1 s and 3 s.
 - b) When is the particle at rest?
 - c) When is the particle moving in the positive direction?
 - d) Draw a diagram to illustrate the motion of the particle.
6. The motion of a particle is described by the position function $s = t^3 - 15t^2 + 63t$, $t \geq 0$, where t is measured in seconds and s in metres.
 - a) When is the particle at rest?
 - b) When is the particle moving in the positive direction?
 - c) Draw a diagram to illustrate the motion of the particle.
 - d) Find the total distance travelled in the first 10 s.
7. If a ball is thrown upward with a velocity of 10 m/s from the upper observation deck of the CN Tower, 450 m above the ground, then the distance, in metres, of the ball above ground level after t seconds is $s = 450 + 10t - 5t^2$.
 - a) When does the ball reach its maximum height?
 - b) Use the quadratic formula to find how long it takes for the ball to reach the ground.
 - c) Find the approximate velocity with which the ball strikes the ground.