

1. The velocity of an object moving along a line is given by $v(t) = 20\cos \pi t$ (ft/s). What is the displacement of the object after 1.5 sec?
2. A projectile is launched vertically from the ground at $t = 0$, and its velocity in flight (in m/s) is given by $v(t) = 20 - 10t$. Find the position, displacement, and distance traveled after t seconds, for $0 \leq t \leq 4$
3. At $t = 0$, a car begins decelerating from a velocity of $80 ft/s$ at a constant rate of $5 ft/s^2$. Find its position function assuming $s(0) = 0$.
4. The acceleration of an object moving along a line is given by $a(t) = 2\sin\left(\frac{\pi t}{4}\right)$. The initial velocity and position are $v(0) = -\frac{8}{\pi}$ and $s(0) = 0$
 - a) Find the velocity and position for $t \geq 0$
 - b) What are the minimum and maximum values of s ?
 - c) Find the average velocity and average position over the interval $[0, 8]$
5. A small plane in flight consumes fuel at a rate (in gal/min) given by

$$R'(t) = \begin{cases} 4t^{1/3} & \text{if } 0 \leq t \leq 8 \text{ (take-off)} \\ 2 & \text{if } t > 8 \text{ (cruising)} \end{cases}$$
 - a) Find a function R that gives the total fuel consumed, for $0 \leq t \leq 8$
 - b) Find a function R that gives the total fuel consumed, for $t \geq 0$
 - c) If the fuel tank capacity is 150 gal , when does the fuel run out?
6. Water flows out of a tank at a rate ($in m^3/hr$) given by $V'(t) = \frac{15}{t+1}$. If the tank initially holds 75 m^3 of water, when will the tank be empty?
7. A projectile is fired upward, and its velocity in m/s is given by $v(t) = 200e^{-t/10}$, for $t \geq 0$.
 - a) Graph the velocity function, for $t \geq 0$.
 - b) When does the velocity reach 50 m/s ?
 - c) Find and graph the position function for the projectile for $t \geq 0$, assuming $s(0) = 0$.
 - d) Given unlimited time, can the projectile travel 2500 m ? If so, at what time does the distance traveled equal 2500 m ?