Examples 1.5 – Rectilinear Motion

1. A car is driven along a straight track with position given by $s(t) = 150t - 300$ ft (t in seconds).

   (a) Find $v(t)$ and $a(t)$.

   Solution:

   (b) Use calculus to find the displacement and total distance traveled over the interval $[1, 4]$.

   Solution:

2. A projectile is fired upward from a 15.3 m cliff at a speed of 19.6 m/s and allowed to fall into a valley below. The acceleration g due to Earth's gravity is about 9.8 m/s^2, or about 32 ft/s^2, downward.

   (a) Given that $a(t) = -9.8$ m/s^2, find $v(t)$ and use it to find the time at which the projectile reaches its maximum height. Find the maximum height of the projectile using geometry.

   Solution:
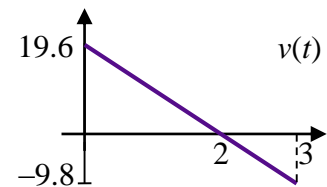
   (b) Use geometry to find the displacement and total distance traveled over the interval $[0, 3]$.

   Solution: