1. Suppose a particle is moving back and forth on a straight line with velocity $v(t) = t^2 - \sqrt{t}$ m/s. We consider the motion of the particle between $t = 0$ seconds and $t = 4$ seconds.
   (a) What is the particle's displacement during this time period? In other words, at time $t = 4$, how far is the particle from the starting point?
   (b) When is the particle moving forward? When is the particle moving backward?
   (c) What is the total distance that the particle traveled during this time period?
   (d) When is the particle moving forward the fastest (between $t = 0$ and $t = 4$)? Moving backward the fastest?