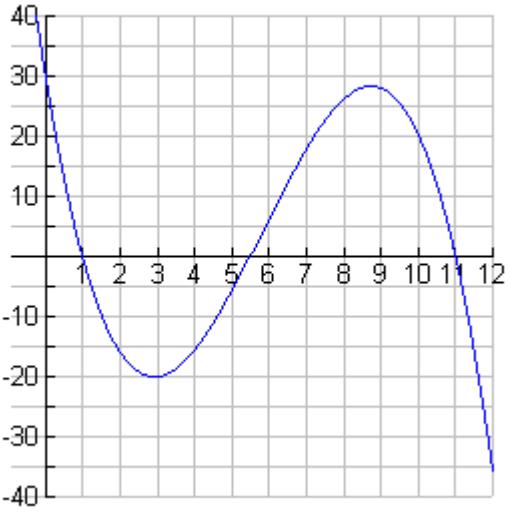
Investigation 3.4.2

Consider the position vs. time graph to the right.



1. Create a situation that fits the graph. Be creative!

   Be sure to include:
   - something moving. (superhero, pet, vehicle, food…)
   - some direction. (in/out, north/south, back/forth…)
   - some "origin". That is, the measure of position is with respect to what?
   - along some line. (track, path, road, esophagus, …)
   - some cause. (trampoline, engines, gravity, …)
   - units

2. Sketch $s'(t)$, the derivative of the position curve with respect to time.
   Yes, this is the velocity curve you will be sketching. (Be sure to include units.)

   a. Explain what this graph describes in the context of the situation. (That is, use full sentences and words from the context to explain what the derivative describes.) We know it's velocity, but what does that *mean* for your context?
   b. For what time values is $s'(t)$ positive?
   c. What is happening in the situation when $s'(t)$ is positive?
   d. For what time values is $s'(t)$ zero?
   e. What is happening in the situation when $s'(t)$ is zero?
   f. Estimate $s'(4)$ from the original graph. Explain the meaning of $s'(4)$ in the context of your situation.

3. Sketch $s''(t)$, the derivative of the velocity curve with respect to time.
   Yes, this is the acceleration curve. (Be sure to include units.)

   a. Explain what this graph describes in the context of the situation. (That is, use full sentences and words from the context to explain what the derivative describes.)
   b. For what time values is $s''(t)$ negative?
   c. What is happening in the situation when $s''(t)$ is negative?
   d. For what time values is $s''(t)$ zero?
   e. What is happening in the situation when $s''(t)$ is zero?