Recall from Friday:

If $f(x)$ is a function, then the *instantaneous rate of change* of f at x is called the **derivative** of f, and is denoted $f'(x)$.

If P gives position at time t, then P' gives velocity at time t.
If C gives cost of producing x units, then $C'(x)$ is the marginal cost of producing the xth unit.

February 4, 2008

Sklensky

The derivative function also gives us the slope of the f-graph at each point. That is,

$$f'(x) = \text{ the slope of the } f \text{ graph at } x.$$

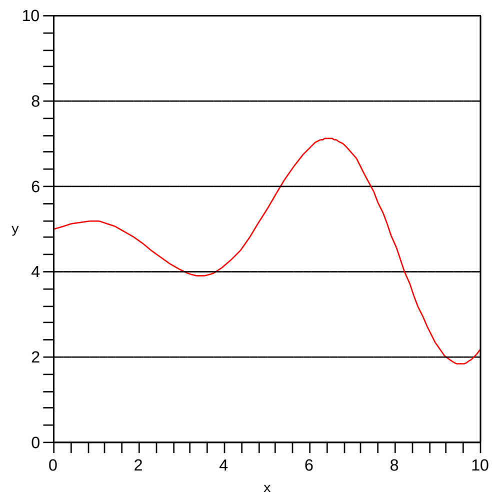
This makes sense because the slope at a point is a measure of how fast the function is changing at that point.

February 4, 2008

Sklensky

The graph gives the position $P(t)$ of a patrol car on the Mass Pike in miles east of Worcester, where t is minutes after noon.

Let $V(t)$ be the car's velocity at time t.



1. Where is $V(t)$ positive? negative? zero?

   Friday, we said:

   $$V(t) > 0 \text{ when } t \in (0,1), (3.6,4), (9.5,10).$$

2. When does the car change directions from driving east to west? from west to east?

3. Use this information to *sketch* a graph $V(t)$.

4. Where is the second derivative of P positive? negative? (Use your graph from 3).

5. Sketch a graph of P''.