

Pre Calc BC**2 - Dist / Veloc.****Name:**

1. Steve gets into his car in the morning, accelerates from zero to 80 mph, drives briefly, then realizes he has forgotten his lunch. He slams on the brake, stops, drives back home. Make the following two plots:

- a) a time v. position plot b) a time v. velocity plot

2. Draw the graph of a continuous function that satisfies the following three conditions

- $f'(x) > 0$, for $x < -2$
- $f'(x) < 0$, for $-2 < x < 2$
- $f'(x) = 0$, for $x > 2$

3. A potato has just been taken out of the oven and is cooling off before being eaten. Consider a graph $f(t)$ of the temperature (in farenheit degrees) of the cooling potato as a function of time (measured in minutes).

- a) Is $f'(t)$ positive or negative? Why?
b) What are the units for $f'(t)$?

4. Consider the graph $f(x) = \sqrt{x}$, for each of the following pairs of values indicate which is larger

- a) $f(1)$ or $f(4)$
b) $f'(1)$ or $f'(4)$
c) $f(2) - f(1)$ or $f(4) - f(3)$
d) $\frac{f(2) - f(1)}{2 - 1}$ or $\frac{f(4) - f(3)}{4 - 3}$

5. A car starts at high speed and its speed decreases gradually. Sketch a graph of the distance the car has travelled as a function of time.

6. Is it possible for a (non-zero) function to be its own slope function? If so, sketch one, if not, explain why it's not possible.

7. Make a table of values rounded to two decimal places for $f(x) = e^x$, for $x = 1, 1.5, 2, 2.5,$ and 3 . Then use the table to answer questions (a) and (b).

- a) Find the average rate of change between $x = 1$ and $x = 3$
b) Approximate the instantaneous rate of change at $x = 2$
c) Use dy/dx on your calculator to find the actual value.
d) How does $f'(2)$ compare to $f(2)$? Hypothesis?

8. Do the same thing for $f(x) = \ln x$.

- a) Use the table to estimate $f'(1), f'(2), f'(4), f'(10)$
b) Use dy/dx to find values for the above on your calculator. Hypothesis?