Read Section 3.1. Work the embedded problems.

1. Definition of the Derivative (version 1)

2. Definition of the Derivative (version 2)

3. In the problems below, let $f(x) = \frac{1}{x}$.

   (a) Using a *rough* sketch of $f(x)$ make a rough estimate of the slope of the tangent to $f(x)$ when $x = -2$.

   (b) Using the first version of the difference quotient, find m_{tan}

   (c) Using the second version of the difference quotient, find m_{tan}

   (d) Write the equation of the line tangent to $f(x)$ when $x = -2$. (Plausible?)

4. Graph the function $G(t) = \begin{cases} -3 & x \leq 1 \\ 2x - 5 & 1 < x \end{cases}$.

   (a) Use the graph to determine $G'(-1)$ and $G'(4)$

   (b) Explain – using the definition – why $G'(1)$ fails to exist.

5. A rock is dropped from a height of 100 feet. Its height above ground at time t seconds later is given by $s(t) = -16t^2 + 100$.

   (a) Find and interpret $s(0)$ and $s(1)$.

   (b) Given $s'(1) = -32$, determine the units of $s'(1)$ and interpret it in the context of the problem.