

SECTION 3-1: DEFINING THE DERIVATIVE

1. Definitions of the Derivative

Version 1

Version 2

2. 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) Use version 1 of the definition to find m_{tan}

(c) Use version 2 of the definition to find m_{tan}

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

3. 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.

4. 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.