

Name: _____

Limit Definition of Derivative

1. Define *derivative*.

2. State the limit definition of a derivative.

3. Given $f(x)$, find $f'(x)$ by using the **limit definition**.

(a) $f(x) = -4$

(b) $f(x) = 5x + 1$

(c) $f(x) = -3x^2 + x + 5$

(d) $f(x) = x^3 + 2x$

(c) $f(x) = \sqrt{x}$

(f) $f(x) = \frac{2}{x}$

4. Using $f(x) = -\frac{3}{2}x^2$, predict if the slope of the tangent line will be positive or negative at $x = -3$, $x = 0$, and $x = 1$. Then find the actual slope of the tangent line at these points.

5. Given $f(x) = x^2 + 2x + 1$, find the slope of the tangent line at $x = -3$.

6. Using the information from question #4, can you find the equation of the tangent line at $x = -3$?