Kuta Software - Infinite Calculus Name_____

Definition of the Derivative

Date_____ Period____

Use the definition of the derivative to find the derivative of each function with respect to *x*.

1) $y = -2x + 5$

2) $f(x) = -4x - 2$

3) $y = 4x^2 + 1$

4) $f(x) = -3x^2 + 4$

5) $y = -4x^2 - 5x - 2$

6) $y = 3x^2 + 3x + 3$

7) $y = \sqrt{-3x - 5}$

8) $f(x) = \sqrt{4x - 5}$

9) $y = \dfrac{1}{x + 2}$

10) $f(x) = -\dfrac{2}{2x - 1}$

Critical thinking question:

11) Use the definition of the derivative to show that $f'(0)$ does not exist where $f(x) = |x|$.

 Name_____

Definition of the Derivative

Date_____ Period____

Use the definition of the derivative to find the derivative of each function with respect to x.

1) $y = -2x + 5$

$\frac{dy}{dx} = -2$

2) $f(x) = -4x - 2$

$f'(x) = -4$

3) $y = 4x^2 + 1$

$\frac{dy}{dx} = 8x$

4) $f(x) = -3x^2 + 4$

$f'(x) = -6x$

5) $y = -4x^2 - 5x - 2$

$\frac{dy}{dx} = -8x - 5$

6) $y = 3x^2 + 3x + 3$

$\frac{dy}{dx} = 6x + 3$

7) $y = \sqrt{-3x - 5}$

$\frac{dy}{dx} = -\frac{3}{2\sqrt{-3x - 5}}$

8) $f(x) = \sqrt{4x - 5}$

$f'(x) = \frac{2}{\sqrt{4x - 5}}$

9) $y = \frac{1}{x + 2}$

$\frac{dy}{dx} = -\frac{1}{x^2 + 4x + 4}$

10) $f(x) = -\frac{2}{2x - 1}$

$f'(x) = \frac{4}{4x^2 - 4x + 1}$

Critical thinking question:

11) Use the definition of the derivative to show that $f'(0)$ does not exist where $f(x) = |x|$.

Using 0 in the definition, we have $\lim_{h \to 0} \frac{|0 + h| - |0|}{h} = \lim_{h \to 0} \frac{|h|}{h}$ which does not exist because the left-handed and right-handed limits are different.