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) $y = 2x + 2$

2) $y = x + 5$

3) $y = 2x + 5$

4) $y = 5x + 4$

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

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

7) $y = -4x^2 + 1$

8) $y = x^2 - 5$

9) $f(x) = x^2 + x - 1$

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

Critical thinking question:

11) Look at your answers for problems 1-10. Try to determine a pattern to guess the derivative of
$y = 2x^2 + 3x + 7$.

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1) $y = 2x + 2$

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

2) $y = x + 5$

$$\frac{dy}{dx} = 1$$

3) $y = 2x + 5$

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

4) $y = 5x + 4$

$$\frac{dy}{dx} = 5$$

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

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

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

$$\frac{dy}{dx} = -6x$$

7) $y = -4x^2 + 1$

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

8) $y = x^2 - 5$

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

9) $f(x) = x^2 + x - 1$

$$f'(x) = 2x + 1$$

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

$$f'(x) = 8x + 4$$

Critical thinking question:

11) Look at your answers for problems 1-10. Try to determine a pattern to guess the derivative of $y = 2x^2 + 3x + 7$.

$\frac{dy}{dx} = 4x + 3$ Each term is worked on independently and the new terms are added or subtracted as in the original function. Constants turn to 0s. Exponents for each term with x are decreased by 1. Coefficients are multiplied by the original exponent. This illustrates the sum, constant, and power rules. You will learn them soon.