

## Differentiation

Date \_\_\_\_\_ Period \_\_\_\_\_

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

1)  $f(x) = -4x + 5$

2)  $f(x) = 4x - 1$

For each problem, find the average rate of change of the function over the given interval.

3)  $y = -x^2 - 2x + 1$ ;  $[-3, -2]$

4)  $y = -\frac{1}{x+1}$ ;  $[0, \frac{1}{2}]$

Differentiate each function with respect to  $x$ .

5)  $f(x) = x^2$

6)  $f(x) = 5x^5$

Differentiate each function with respect to  $x$ . Problems may contain constants  $a$ ,  $b$ , and  $c$ .

7)  $f(x) = 2x^{\frac{5}{2}}$

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

9)  $f(x) = -3x^{2c}$

10)  $f(x) = -2x^b$

11)  $f(x) = -\frac{4}{x^4}$

12)  $f(x) = 2x^{\frac{3}{2}}$