

## Slope Functions: Power Rule Practice

First & Last Name: \_\_\_\_\_ Class: \_\_\_\_\_

Use the generalized *Power Rule*:

$$\text{if } f(x) = a(x - h)^n + k, \text{ then } f'(x) = a n(x - h)^{n-1}$$

to find the derivative of each function.

1.  $y = x^8$

2.  $y = x$

3.  $y = \sqrt[3]{x}$

4.  $f(x) = x^2 - 10x + 100$

5.  $g(x) = x^{100} + 50x + 1$

6.  $v(r) = \frac{4\pi r^3}{3}$

7.  $s(t) = t^8 + 6t^7 - 18t^2 + 2t$

8.  $y = x^{-2/5}$

9.  $y(t) = 6t^{-9}$

10.  $f(x) = (2x)^3$

11.  $g(x) = x^2 + \frac{1}{x^2}$

12.  $y = \frac{x^2 + 4x + 3}{x}$

13.  $f(x) = x - 3x^{1/3}$

14.  $y = 5x^{-4} - \frac{7}{8}x^{-2} + 3x^2 - 6$

15.  $y = \frac{x^{12} - 2x^9 + 5x^{-7}}{4}$

Continued...

## Challenge (required for Honors)

16. Find the derivative of  $y = \frac{3}{4x^3} + \frac{7}{2x^9} + \sqrt[5]{x^4} - \sqrt[8]{x^9}$ .

17. Given  $f(x) = x^4 - 3x^3 + 16x$ , find  $f'(x)$  and  $f''(x)$ .

18. Find the equation of the line tangent to  $y = x + \sqrt{x}$  at the point  $(1, 2)$ .

19. Find points on the curve  $y = x^3 - x^2 - x + 1$  where the tangent is horizontal.