

## AP Calculus AB

Name: \_\_\_\_\_

Power, Product, &  
Quotient Rules

HW 2-5

Differentiate.

1)  $f(x) = 6x^{5/3}$

2)  $f(x) = 8x^{3/2}$

3)  $g(x) = x^4 - 3$

4)  $g(x) = 15 - x + 4x^2 - 5x^4$

5)  $f(x) = 12 - 3x^4 + 4x^6$

6)  $g(x) = x^4 - \sqrt[4]{x^3}$

7)  $f(x) = (x^3 - 7)(2x^2 + 3)$

8)  $h(x) = (2x^2 - 4x + 1)(6x - 5)$

9)  $f(x) = x^{1/2}(x^2 + x - 4)$

10)  $f(x) = \frac{8x + 15}{x^2 - 2x + 3}$

11)  $f(x) = \frac{1}{1 + x + x^2 + x^3}$

$$12) p(x) = 1 + \frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3}$$

$$13) h(x) = \frac{7}{x^2 + 5}$$

14) Find the  $x$ -coordinates of all points on the graph of  $y = x^3 + 2x^2 - 4x + 5$  at which the tangent line is horizontal.

15) Find the points  $(x, y)$  on the graph of  $y = x^{3/2} - x^{1/2}$  at which the tangent line is parallel to the line  $y - x = 3$ .

16) Find the points  $(x, y)$  on the graph of  $y = x^{5/3} + x^{1/3}$  at which the tangent line is perpendicular to the line  $2y + x = 7$ .

17) The position of a balloon is given by  $s(t) = 6 + 2t + t^2$ .

a) When will the balloon hit the ground?

b) Find the velocity at  $t = 1$ ,  $t = 4$ , and  $t = 8$ .

c) When will the velocity be  $20 \text{ ft/sec}$ ?