

Math 1100-5
Fall 2004

Name: _____

Derivative Practice

Instructions Compute the following derivatives or derivative applications using the techniques and rules developed in class. Recall the rule of thumb: simplify only when needed or for clarity.

1. $f(x) = x^{3/2} + 5x^2 + 3$

4. $r(t) = (t^2 + 1)^4 (\sqrt{t+1})$

2. $f(x) = \frac{\sqrt{x^2+1}}{x+1}$

5. $f(x) = x(x^2 + 4)^{1/3}$

3. $g(t) = \frac{t+1}{t^4+\sqrt{t}}$

6. $f(x) = \frac{\sqrt{x+1}}{(x+4)^2}$

$$7. g(t) = [(t + 1)(t^2 + 5)]^4$$

$$10. s(t) = (t^3 + 4\sqrt{t})^{5/2}$$

$$8. y(x) = \frac{x+1}{\sqrt{x(x^2+1)}}$$

$$11. w(p) = (p^2 + 1)^{-5}$$

$$9. y(x) = \frac{2x-1}{9x^3+x^{5/2}}$$

12. Suppose the revenue function for a product is given by:

$$R(x) = 15(2x + 1)^{-1} + 30x - 15,$$

where x is in the thousands of units, and R is the thousands of dollars made.

- Find the marginal revenue when 2000 units are sold.
- How is the revenue changing when 2000 units are sold?

13. Find all points (x, y) where the slope of the tangent for $f(x) = (x^2 - 4)^3 + 12$ is 0.

14. Given that $g(x) = 5 - 3(1 - x^2)^{4/3}$, find all x values for which:

$$f'(x) = 0$$

$$f'(x) > 0$$

$$f'(x) < 0,$$

and determine values x where the function is increasing and where it is decreasing.

15. Write the equation of the tangent line at $x = 3$ for

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