

MATH 1710.200 - Homework 4

Due: 9/28/16

1. 3.2 #5, 6, 9, 14, 16
2. 3.3 #7-12
3. 3.4 #12, 19, 24, 43
4. Find the equation of the tangent line to the graph of $f(x) = x^3 - 4x^2 - 3x$ at $x = 2$.
5. Find the derivative of $f(t) = (7t^2 + 6t - 1)\sqrt{t}$.
6. Find the derivative of $f(x) = \frac{2x - 1}{5 - 5x}$
7. Let $f(x) = x^8 - x^4 + 2x^2 + 1$. Compute the first three derivatives $f'(x)$, $f''(x)$, and $f'''(x)$.
8. Consider $f(x) = \frac{x^2 + 4\sqrt{x}}{x^2}$. Compute the derivative in 3 different ways and verify that you get the same answers.
 - (a) Apply the quotient rule and simplify.
 - (b) Use the common denominator to rewrite the function as a sum of powers of x , and then apply the power rule.
 - (c) Rewrite the function as a product, apply the product rule, and simplify.
9. Suppose that f , g are differentiable at $x = 1$ and that $f(1) = 2$, $f'(1) = -1$, $g(1) = -2$, and $g'(1) = 3$. Evaluate $h'(1)$ where
$$h(x) = \frac{f(x)}{g(x)} - f(x)g(x).$$
10. Find all points on the graph of $y = x^2 + 3x - 7$ for which the tangent line has a slope of 4.
11. Consider $f(x) = \frac{x^2 + 4\sqrt{x}}{x^2}$. Compute the derivative in 3 different ways and verify that you get the same answers:
 - (a) Rewrite the function as a sum of powers of x and then apply the power rule.
 - (b) Apply the quotient rule.
 - (c) Rewrite the function as a product and use the product rule.
12. Suppose f is a function so that $f(4) = 10$ and $f'(4) = -2$ and let $g(x) = x^2 f(x)$. Use the product rule to compute $g'(4)$.