



Math 151
Week-In-Review 5

3.1 and 3.2
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Problem Statements

1. If $f(x) = x^3$ show $f'(x) = 3x^2$.

2. If $g(x) = c \cdot f(x)$ show $g'(x) = c \cdot f'(x)$.



3. Calculate $f'(x)$ for the function $f(x) = x^{100} - 15x^5 + 6x - 5$.

4. Find $\frac{d^2y}{dx^2}$ if $y = 5e^x - x^{7/8}$.



5. Determine the slope of the tangent line to the curve $g(x) = 3\sqrt{x} - \frac{1}{x^2} + 16$ when $x = 1$.

6. Find the equation of the tangent line to the curve $f(x) = x^{3/2}$ that passes through the point $(0, -4)$.



7. Evaluate $\lim_{x \rightarrow 1} \frac{x^{1000} - 1}{x - 1}$.



8. Consider the function $f(x) = (x - 2)e^x$.

(a) Find $f'(x)$.

(b) Find $f''(x)$.

(c) Find $f'''(x)$.

(d) Find a formula for the n^{th} derivative of the function, $f^{(n)}(x)$.



9. Determine the equation of the tangent line to the curve $f(x) = \frac{4e^x - 2x^7}{x^2 + 1}$ when $x = 0$.



10. Suppose $p(x) = f(x)g(x)$ and $q(x) = \frac{f(x)}{g(x)}$, where f and g are differentiable functions. Use

the following table to evaluate the derivatives below.

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
1	3	-4	6	10
2	4	-7	5	6

(a) $p'(1)$

(b) $q'(2)$



11. If $f(x)$ is a differentiable function, find the derivative of $y = \frac{1 + x \cdot f(x)}{\sqrt{x}}$.

12. If $g(x)$ is a differentiable function, find the derivative of $y = x \cdot e^x \cdot g(x)$.