Math 131 - Assignment 7

Name _____

March 20, 2024

Score _____

Show all work to receive full credit. Supply explanations when necessary. Use extra paper as necessary. This assignment is due March 27.

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1. Suppose f and f^{-1} are differentiable functions. The table below shows the values of $f(x)$ and $f'(x)$ at selected values of x. Find $(f^{-1})'(3)$. Show how you got it.

x	0	1	2	3
$f(x)$	5	3	7	2
$f'(x)$	0	8	4	1

2. Let $g(x) = (\cos^{-1} x)^2$. Find the **exact value** of $g'(1/2)$. Simplify your answer as much as possible.

3. Find $h'(x)$ if $h(x) = \log_5[(6x^2 + 4)^9]$.

4. Find dy/dx if $y = x^3 e^{\cot x}$.

5. Use logarithmic differentiation to find dy/dx when $y = (\sin x)^x$.

6. Let $f(x) = \ln(x^2 + 1)$. Find $f'(x)$ and use it to determine a point at which the graph's tangent line is horizontal.

7. Find $g''(x)$ if $g(x) = e^{-5x^2}$.

8. Use logarithmic differentiation to find $\dfrac{dy}{dx}$ when $y = \dfrac{(x+1)^2(x^3+1)}{4x^2(x-5)}$.

9. Find $\dfrac{dy}{dx}$ if $y = \tan^{-1}(\sqrt{x})$.

10. Find $f'(x)$ if $f(x) = e^{x \ln x}$.

11. Find an equation of the line tangent to the graph of $y = 2^{x^3}$ at the point where $x = 1$.