

Math 131 - Assignment 7

March 26, 2025

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. Use extra paper as necessary. This assignment is due April 2.

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 $f(x) = x^5 + 7x - 9$.

(a) Compute $f^{-1}(-1)$.

(b) Compute $(f^{-1})'(-1)$.

(c) Compute $f^{-1}(11)$. (You'll probably have to use a calculator to approximate the value.)

(d) Compute $(f^{-1})'(11)$.

Turn over.

3. Determine each derivative.

(a) $\frac{d}{dx} x^2 \sin^{-1}(x^3)$

(b) $\frac{d}{dt} \frac{7}{e^{5t}}$

(c) $\frac{d}{dx} \ln[(x^2 + 1)^3]$

4. Let $g(x) = (\cos^{-1} x)^2$. Find the exact value (not a decimal approximation) of $g'(1/2)$. Simplify your answer as much as possible.

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

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