Worksheet 06

Instructor: Hong Chen **Topics:** Sections 3.3, 3.5, 3.7–3.9

Due: Sunday, November 8, 2026, at 11:59 p.m. **Submit:** Gradescope

Implicit differentiation

1. Find dy/dx in terms of x and y, and evaluate it at the indicated point.

(a) $x^2 + xy + y^2 = 7, \quad (1, 2)$

(b) $xe^y + y^2 = 1, \quad (1, 0).$

Inverse trigonometric functions

2. Find the derivative of each function and state where your formula applies.

(a) $f(x) = x^2 \cdot \arctan(3x)$

(b) $g(x) = \arcsin\left(\dfrac{x^2}{2}\right).$

Products and compositions

3. Find dy/dx for each function.

(a) $y = (x^3 - 1) \cdot e^{\sin x} \cdot \arctan x$

(b) $y = \sin\left(e^{x^2+1}\right)$.

Exponential and logarithmic functions

4. Find the derivative of each function.

(a) $f(x) = 2^{\cos x}$

(b) $g(x) = \log_3(1 + e^{2x})$.

5. Let $f(x) = \ln(1 + e^x)$. Find $f'(x)$ and $f''(x)$, and evaluate $f''(0)$.