

MATH 1300 — Derivatives of Logarithmic Functions

1. Compute each exactly.

(a) $\log_2(64^{3/2})$

(b) $\log_4\left(\frac{1}{256}\right)$

(c) $\ln(e^{-5})$

2. Differentiate $p(t) = \ln(t^2 + 8)$.

3. Differentiate $y = \log_5\left((x^2 - 3x)^4\right)$.

4. Let $f(x) = \log_b(7x + 2)$ with $b > 0$, $b \neq 1$. Find the value of b such that $f'(0) = 5$.

5. Compute y' for $y = (\sin(2x))^x$.

6. Compute y' for $y = (x^2 + 1)^{\sin x}$.

7. Compute y' for $y = x^{x^2}$ ($x > 0$).