

**Section 3.6: Additional Problems**

In problems 1-3, use logarithm and exponential properties to simplify the function and then take the derivative.

1.  $y = \ln((x^2 + 1)^3(x + 5)^5)$

2.  $y = \ln\left(\frac{(x^3 + 1)^2}{(x^4 + 5)^3}\right)$

3.  $y = \ln\left(\frac{(3x + 5)^5 e^{3x^2 + 5}}{(2x + 1)^3}\right)$ 

---

In problems 4-9, find each derivative. You do not have to simplify.

4.  $f(x) = 1 + \ln x + (\ln x)^2 + (\ln x)^3$

5.  $y = 2^{\log(x^5 + 7)}$

6.  $y = \ln(\ln(x^2 + 5))$

7.  $f(x) = \ln(\ln(\ln(x + 2)))$

8.  $f(x) = [\ln(x^2 + 1)]^{\frac{4}{3}}$

9.  $f(x) = \left[\frac{\ln(x) + 4}{e^{2x}}\right]^4$ 

---

In problems 10-14, find each derivative by using logarithmic differentiation. You do not have to simplify.

10.  $f(x) = (3x^5 - 1)^4(x^3 + 2)^2$

11.  $y = \frac{(x^3 + 5)^5}{(2x^2 + 1)^4}$

12.  $f(x) = e^{(x^4 + 3x^2 + 1)}(2x^3 + 7x)^3$

13.  $y = (x^2 + 1)^{x^3}$

14.  $y = (x^4 + 3x)^{\tan(5x + 4)}$