Lab Worksheet for September 9, 2021

Practice with Derivatives of Logs Using the Chain Rule.

1. Compute the following without calculators

a) $\ln(e^3)$.

b) $e^{\ln(3)}$.

c) $e^{\ln(2)+\ln(3)}$.

d) $e^{\ln(6)-\ln(2)}$.

2. Simplify each of the following logarithms.

a) $\log_4(x^3 y^5)$.

b) $\log(x^9/y^5)$.

Find the derivative of the following functions (1-16).

1. $f(x) = \ln(x)$.

2. $h(x) = 7^x$.

3. $g(x) = e^x$.

4. $f(x) = \ln(5x)$.

5. $g(x) = \ln(x^3)$.

6. $f(x) = e^{4x}$.

7. $g(x) = 3e^{x/3}$.

8. $h(x) = \log(x)$.

9. $f(x) = 3\ln(x) + x^2 - 5$

10. $g(x) = x^3 - e^{2x} + \ln(2x)$

11. $h(x) = e^{3x+2} - 4x^2 + 25$

12. $f(x) = \sin(\cos(e^x))$.

13. $g(x) = e^{x + 3(x)^2}$.

14. $h(x) = \cos(3x) + \log_3(x)$.

15. $f(x) = e^{\sin(x) + \cos(x)}$.

16. $g(x) = 5^x + (3x^2 - \cos(x))^3$.

17. A Cessna plane takes off from an airport at sea level and its altitude (in feet) at time t (in minutes) is given by h = 2000 ln (t + 1). Find the rate of climb at time t = 3 min.