Use properties of logarithms to expand the following. Go as far as you can using the properties.

1. $\log_3 \dfrac{x^5}{y^3}$

2. $\log_b \sqrt[3]{N}$

3. $\log(3^2 \sqrt[3]{4})$

4. $\log_2(50 \cdot 2^{-0.2t})$

5. $\ln[P(1+r)^t]$

6. $\log_{\frac{1}{2}} \dfrac{\sqrt{a}}{b^3}$

Combine the following into a single logarithm of the form $\log_b[\ \ ]$. Simplify as much as possible.

7. $2\ln x - 3\ln(x+1)$

8. $\log_4 x + \dfrac{2}{3}\log_4(x+5)$

9. $\dfrac{1}{2}\log_2 9 - \log_2 6$

10. $\dfrac{1}{2}\log 4 - \dfrac{2}{3}\log 8 + 2\log 2$

Use properties of logarithms to combine the LHS and find x. [Be sure to check your answer in the original equation.]

11. $\log x + \log 4 = \log 20$

12. $\log_8(x+2) + \log_8 x = \log_8 24$

Use the change of base formula to find the following.

13. $\log_5 18$

14. $\log_4(.14)$

Use the change of base formula and your calculator to graph the following. [Copy the graph below and label the axes.]

15. $y = \log_7 x$

1. $5\log_3 x - 3\log_3 y$

2. $\frac{1}{3}\log_b N$

3. $2\log 3 + \frac{1}{3}\log 4$

4. $\log_2(50) - 0.2t$

5. $\ln P + t\ln(1+r)$

6. $\frac{1}{2}\log_{\frac{1}{2}} a - 3\log_{\frac{1}{2}} b$

7. $\ln\left(\frac{x^2}{(x+1)^3}\right)$

8. $\log_4\left(x\sqrt[3]{(x+5)^2}\right)$

9. -1

10. $\log 2$

11. $x = 5$

12. $x = 4$

13. 1.79588

14. -1.41825

15. calculator

Homework: Section 5.2, p. 348: #27-45(odd), 49, 50, 51, 53, 57, 61