

Section 1.5

Section Objectives:

- Know the definition of the logarithm function $\log_a(x)$ as the inverse of a^x .
- Know the definition of the natural logarithm function $\ln(x) = \log_e(x)$
- Know the cancelation properties of exponentials and logarithms.
- Know the log rules for multiplication, division and powers.
- Solve equations using logarithms.
- Rewrite exponential functions by changing the base, and use the change of base formula for logs.

Practice Problems

1. Solve for x . Give an exact answer and an answer rounded to 3 decimal places.

$$2\ln(x) = 4.$$

2. Simplify $e^{\frac{1}{2}\ln(16)}$

3. Solve for x . Give an exact answer and an answer rounded to 3 decimal places.

$$\ln(x + 1) - 5 = \ln(2).$$

4. Simplify $\log_3(x) + \log_3(2x + 1) - \log_3(y)$.

5. Rewrite $f(x) = 3^x$ as e^{kx} , for some k .

6. Rewrite $\log_5(x)$ using the natural log function: $\ln(x)$. Then check your answer by evaluating each function at $x = 25$.

7. If an account earn 2% interest compounded monthly, how long does it take for the amount of money in the account to double?

8. If an account earn 2% interest compounded continuously, how long does it take for the amount of money in the account to double?

9. If a population is growing exponentially according to the function $P(t) = P_0e^{kt}$, where P_0 is the initial population, k is some positive constant and t is time in years, find the time needed for the population to double. Your answer will depend on k .

More Practice from Textbook 1.5: You should do as many problems from each set (1-6, 7-16, 17-22, 23-28, 29-40, 41-45, 46-47, 48-65, 66-74), as needed until you are comfortable with these techniques. 48-65 are good practice for application problems.