

1. Evaluate.

a.  $\log 1000$

b.  $\log_4 1$

c.  $\log_3 27$

d.  $\log_2 \left(\frac{1}{4}\right)$

2. Solve for  $x$ .

a.  $\log_4 x = 2$

b.  $\log_{\frac{1}{3}} x = 4$

c.  $\log(2x + 1) = 2$

d.  $\ln e^{3x-1} = 5$

3. Use log properties to solve the equation.  $\log_3 x = \log_3 7 + \log_3 3$ .

4. Use log properties to simplify the expression.  $2 \log_{10} 5 + \log_{10} 8 - \log_{10} 2$

5. Use log properties to expand as much as possible.

a.  $\log_2(6x^{-3}y^7)$

b.  $\ln \frac{e^y}{\sqrt[3]{x}}$

c.  $\log_5 \left(\frac{x^2 - 7x - 18}{5}\right)$

6. Solve and write the exact solution(s) in a solution set. Show domain restrictions where appropriate.

a.  $2^{4-3x} = \frac{1}{128}$

b.  $\log_4(x - 7) + \log_4(5x + 9) = 4$

7. LaShonda invests into a corporate bond at 4.5 percent compounded quarterly. If she wants to double her money, how many years will it take? How long will it take to triple her money?

$$A = P \left( 1 + \frac{r}{n} \right)^{nt}$$

8. The half-life of Carbon 14 is 5,715 years. What percent of the Carbon 14 will remain 12,000 years after its creation?

$$N = N_0 e^{kt}$$

9. For each of the following functions:

- State the domain of the function
- Describe the end behavior of the function.
- If the function has any asymptotes, state the equation for each asymptote and identify the type of asymptote (vertical, horizontal, or oblique).
- If the function has any holes, state the location of each hole.

a.  $f(x) = \frac{2x - 6x^2}{3x - 1}$

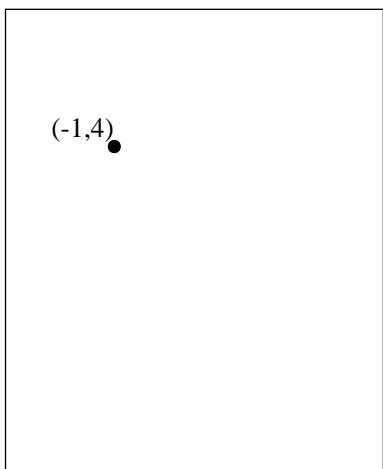
b.  $f(x) = -2x^2 + 3x - 4$

c.  $f(x) = \frac{3x - 1}{3 + x^2}$

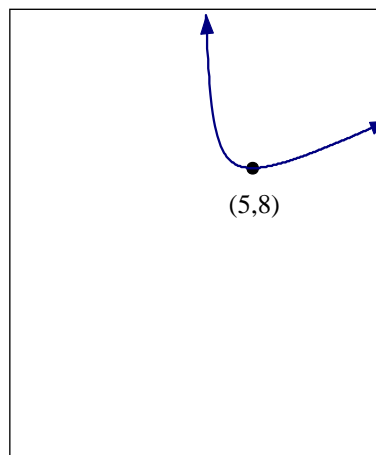
d.  $f(x) = 3x^2 - 1$

e.  $f(x) = \frac{(x+2)^2(x-2)(x+4)}{(1-x^2)(x+4)}$

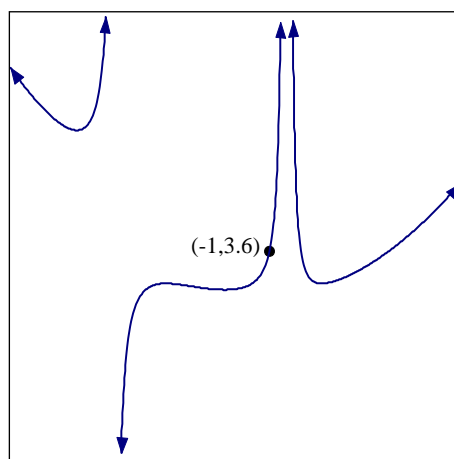
2. Decide whether the function shown is most likely a polynomial, rational or something else. After you have decided, find a formula for the graph. Please note, you may not assume that the leading coefficients are 1.



**Figure 1:**



**Figure 2:**



**Figure 3:**

4. Draw complete graphs of each function, following the procedures outline in the rational function and polynomial function lecture notes.

a. Graph  $y = \frac{(x+2)^2(x-2)(x+4)}{(1-x^2)(x+4)}$

b. Graph  $y = -\frac{(x-3)^2(x+2)}{3}$

