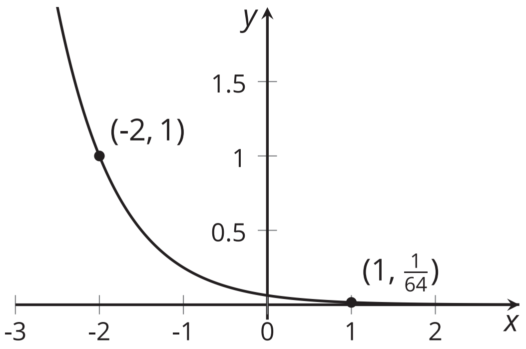
Lesson 18 Practice Problems

1. A function g can be represented with a graph that contains $(-2, 1)$ and $\left(1, \frac{1}{64}\right)$.

   Write an equation of the form $g(x) = a \cdot b^x$ to define the function.

   (From Unit 4, Lesson 6.)

2. Using the fact that $2^{10} = 1024$, Tyler estimates that 2^{20} is about 1,000,000, and $\log_2(1{,}000{,}000)$ is about 20. Do you agree with Tyler?

   (From Unit 4, Lesson 10.)

3. For each logarithmic equation, write an equivalent equation in exponential form.

   a. $\ln 618 = p$

   b. $\ln q = 2$

   c. $\ln 100 = t$

   d. $\ln(e^3) = 3$

   (From Unit 4, Lesson 14.)

4. The function f given by $f(t) = 10e^{0.07t}$ models the balance in a bank account, in thousands of dollars, t years after it was opened.

   a. What was the opening balance?

   b. About when does the account balance reach 1,000,000 dollars? Explain or show how you know.

(From Unit 4, Lesson 15.)

5. The function f is given by $f(x) = 20 \cdot e^x$.

   a. Write an equation of an exponential function g whose graph meets the graph of f for a positive value of x.

   b. Write an equation of an exponential function h whose graph does not meet the graph of f for any positive value of x.

(From Unit 4, Lesson 16.)

6. The area of a wall covered by mold is growing exponentially. Without treatment, the area doubles every month.

    a. Complete the table.

    b. Write a function, f, to represent the time in months as a function of the square feet of area covered by mold, a.

    c. The wall is 240 square feet; about how many months will it take for the area to be completely covered by mold? Show your reasoning.

area in square feet	time in months
1	0
2	
16	
20	
32	
64	
100	
a	

(From Unit 4, Lesson 17.)

7. A bank account had a balance of \$100. Because of the interest accumulated over time, the balance doubles every decade. No withdrawals or other deposits are made.

   a. To find out when the account will have a balance of \$1,000, Diego wrote: $100 \cdot 2^t = 1{,}000$ and Mai wrote: $t = \log_2 \left(\frac{1000}{100} \right)$. Show that the equations are equivalent and have the same solution.

   b. Use either of the strategies to find out when the account will have the following amounts. Show your reasoning.
      i. \$5,000

      ii. \$12,000

   c. Write an equation that shows when (at what value of t) the account will have x dollars.

(From Unit 4, Lesson 17.)