

# Assignment

## Write

Explain the difference between simple interest and compound interest.

## Remember

An exponential growth function has a  $b$ -value greater than 1 and is of the form  $y = a \cdot (1 + r)^x$ , where  $r$  is the rate of growth. An exponential decay function has a  $b$ -value greater than 0 and less than 1 and is of the form  $y = a \cdot (1 - r)^x$ , where  $r$  is the rate of decay.

## Practice

- Taylor just received a \$2500 bonus check from her employer. She is going to put it into an account that will earn interest. The Level 1 savings account at her bank earns 6% simple interest. The Platinum savings account earns 4.5% compound interest.
  - Write a function for each account that can be used to determine the balance in the account based on the year,  $t$ . Describe each function.
  - Use your answers to part (a) to create a table of values for each function.
  - Use technology to graph the functions for the Level 1 and Platinum savings accounts. Then, sketch the graphs.
  - Into which account would you recommend that Taylor deposit her money? Explain your reasoning.
  - After reading the pamphlet about the different accounts a little more closely, Taylor realizes that there is a one-time fee of \$300 for depositing her money in the Platinum account. Does this change the recommendation you made in part (d)? Why or why not?
  - Compare the rates of change for the Level 1 and Platinum savings accounts. Explain what the rates of change tell you about the accounts.
  - What do the rates of change for linear and exponential functions tell you about the graphs of the functions?
- Brook works for the owners of a bookstore. Her starting salary was \$24,500, and she gets a 3% raise each year.
  - Write an equation in function notation to represent Brook's salary as a function of the number of years she has been working at the bookstore.
  - What will Brook's salary be when she begins her fourth year working at the bookstore? Show your work.

## Stretch

Consider a piece of paper that is 0.1 mm thick. How many times must it be folded so that it reaches the top of the Eiffel Tower? Assume the paper is as large as needed, and it is possible to fold it as many times as required.

## Review

1. Roberto and Maeko open a pet store and start with 5 hamsters for sale. Hamster populations usually triple every cycle. One cycle is equal to 4 months. Write an equation in function notation to represent the change in the number of hamsters as a function of the cycle number,  $c$ . Explain how you determined your equation.
2. Write an exponential function to model this table of values.

$x$	$g(x)$
1	0.6
2	0.06
3	0.006
4	0.0006

3. Write a function,  $g(x)$ , and sketch a graph that is translated 3 units up from and 4 units to the right of  $f(x) = \left(\frac{1}{2}\right)^x$ .
4. Write a function,  $h(x)$ , and sketch a graph that is a reflection of  $f(x) = -3^x$  across the line  $y = 0$ .
5. Solve each equation for  $x$  and justify each step.
  - a.  $-3x = -18$
  - b.  $\frac{(x+4)}{2} = \frac{(x-5)}{3}$