

Consider an exponential function in the form  $f(x) = a \cdot b^x$ . Assume that  $a$  (the y intercept) is positive.

- If  $b$  (the common ratio) is greater than 1, the function is growing/increasing.
- If  $b$  is between 0 and 1, the function is decaying.

What are some examples of exponential growth?

\$ in an account where you get interest

What are some examples of exponential decay?

Depreciating car value

2. Consider the exponential function  $f(x) = 21,000 \cdot 0.91^x$ , which models the value of Robert's car, where  $x$  represents the number of years since he purchased the car.

a. Is the value of Robert's car growing or decaying?

Decaying

b. What is the rate of growth or decay?

$$1 - 0.91 = 0.09 = 9\%$$

c. What does 21,000 represent?

How much he paid for the car

1. Consider the exponential function  $f(x) = 500 \cdot 1.05^x$ , which models the amount of money in Tyler's savings account, where  $x$  represents the number of years since Tyler invested the money.

a. Is the money in the account growing or decaying?

Growing

b. What is the rate of growth or decay?

$$1.05 - 1 = 0.05 = 5\%$$

c. What does 500 represent?

Initial money in account

d. Consider  $f(8) = 738.727721895$ . While this is correct, is it an appropriate answer in this context?

\$738.73

3. Consider the exponential function  $f(x) = 1,250 \cdot 1.08^x$ , which models the amount of money invested in a bond fund, where  $x$  represents the number of years since the money was invested.

a. What is the rate of growth or decay?

Growth  
0.08 = 8%

b. What does 1,250 represent?

Initial \$ in the account

4. Consider the exponential function  $f(x) = 25,000 \cdot 0.88^x$ , which models the amount of money remaining in Lola's retirement fund, where  $x$  represents the number of years since Lola began withdrawing the money.

a. What is the rate of growth or decay?

Decay;  $0.12 = 12\%$

b. What does 25,000 represent?

Initial \$ in-account

**BEAT THE TEST!**

1. The equation  $y = 250 \cdot 1.04^x$  models

- exponential growth.  
 exponential decay.

The rate of growth/decay is

- 4%.  
 96%.  
 104%.

2. The function  $f(x) = 350 \cdot 0.75^x$  models the amount of money remaining in Alicia's summer budget, where  $x$  represents the number of weeks since summer began. Which of the following are true statements? Select all that apply.

- The function models exponential decay.  
 350 represents the amount of money Alicia had in the budget at the beginning of summer.  
 The rate of decay is 25%.  
 Alicia spent \$262.50 during the first week of summer.  
 At the end of the second week, Alicia will have less than \$200.00 in the budget.

$350 \cdot 0.75^1$   
 $350 \cdot 0.75^2$