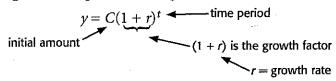
Exponential Growth Functions

3.1 + 8.2

You can model exponential growth using the following formula:



Rules for Writing and Evaluating an Exponential Growth Function

- **1.** Identify C, the initial amount. Identify r, the growth rate. Identify t, the time.
- **2.** Plug *C*, *r*, and *t* into the formula for exponential growth.
- **3.** Evaluate the equation; the result is the amount after a certain period of time.

Example

A savings account starts with a balance of \$200.00. Interest on the account is 6% each year. What is the balance after 10 years?

Step 1 Identify *C*; the initial amount.

Identify *r*, the growth rate.

Identify *t*, the time period.

Step 2 Plug C, r, and t into the formula for exponential growth.

Step 3 Evaluate the equation; the result is the amount after a certain period of time.

- C, the initial amount is \$200.00 r, the growth rate or 6% or 0.06. t, the time period is 10 years.
- $v = 200(1 + 0.06)^{10}$
- $y = 200(1 + 0.06)^{10} = 200(1.06)^{10}$ y = 200(1.79) = \$358

Practice

Solve.

1. A savings account starts with a balance of \$500.00. Interest on the account is 10% each year. What is the balance after 5 years?

Identify C; the initial amount.

Identify r, the growth rate. Identify *t*, the time period. C, the initial amount is _____

r, the growth rate, is 10% or ____

t, the time period is _____ years.

Plug C, r, and t into the formula for exponential growth.

Evaluate the equation; the result is the amount after a certain period of time.

y = _____(1 + ____)----

y = ____(1 + ____)---= ___(___)ν = ____(___) = ____

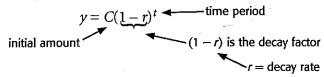
2. A population of bacteria has a growth rate of 2% per hour. You start with 50 bacteria.

How many bacteria are there after 20 hours?

3. An organism's weight increases at a growth rate of 5% each day. If the initial weight is 0.75 grams, what is the weight after 14 days?

Exponential Decay Functions

You can model exponential decay using the following formula:



Rules for Writing and Evaluating an Exponential Decay Function

- 1. Identify C, the initial amount. Identify r, the growth rate. Identify t, the time.
- **2.** Plug C, r, and t into the formula for exponential decay.
- **3.** Evaluate the equation; the result is the amount after a certain period of time.

Example

A car was bought for \$15,000.00. The value of the car decreases in value by 10% each year. What is the value of the car after 5 years?

Step 1 Identify C; the initial amount.

Identify r, the decay rate. Identify t, the time period.

C, the initial amount, is \$15,000.00.

r, the decay rate, is 10% or 0.10.

t, the time period, is 5 years.

Step 2 Plug C, r, and t into the formula for

exponential decay.

 $y = 15,000(1 - 0.10)^5$

Step 3 Evaluate the equation; the result is the

amount after a certain period of time.

 $y = 15,000 (1 - 0.10)^5$ = 15,000(0.90)⁵ = 8,857.35

Practice

1. A copy machine is bought for \$2,000. The value of the copier decreases at a rate of 25% each year. What is the value of the copier after 4 years?

Identify *C*; the initial amount.

Identify r, the decay rate.

Identify t, the time period.

C, the initial amount is _____.

r, the decay rate, is 25% or _____.

t, the time period, is ______ years.

Plug *C*, *r*, and *t* into the formula for exponential decay.

Evaluate the equation; the result is the amount after a certain period of time.

y = ____(1 - ____)

y = _____(1 - ____) ____

- **2.** A business has a profit of \$50,000. Profits decrease by 2.5% each year. What is the profit in the 10th year?
- **3.** A truck is bought for \$25,000. The value of the truck decreases at a rate of 10.5% per year. What is the value of the truck after 3 years?, 6 years?, 12 years?