8.8 - Exponential Growth and Decay

or

$y = a \cdot b^{x}$ ← # of compounds

- a: starting value
- b: growth or decay factor
  - $b > 1$ growth
  - $0 < b < 1$ decay

Vocabulary:

Growth

Decay

Compound Interest

1st 10% 2nd amount

Simple interest: 100 (+10) 100 (+10) 100 (+10)

Compound interest: 100 110 121

"earn interest on the initial value & interest" +10 +11 +12.10

$$y = ab^x$$

Identify the intitial amount a and the growth factor b in the exponential function.

$$y = 10{,}000(1.01)^x$$

$a = 10{,}000$

$b = 1.01$ or 101%

Assume the interest rate is an annual interest rate. Find the interest rate for an account that is compounded quarterly and monthly.

3%

$3\% \div 4 = 0.75\%$

$3\% \div 12 = 0.25\%$

4.5%

$4.5\% \div 4 = 1.125\%$

$4.5\% \div 12 = 0.375\%$

6.25%

$6.25 \div 4 = 1.5625\%$

$6.25 \div 12 = 0.52083\%$

Find the balance in the bank account given the following information:

$y = a \cdot b^x$

$12,000 principal earning 4.8% compounded annually after 7 years.

$y = 12{,}000 \cdot 1.048^7$

$16,661.35

100%
+ 4.8%
104.8%

$12,000 principal earning 4.8% compounded quarterly after 7 years.

$y = 12{,}000 \cdot (1.012)^{28}$

$y = \$16{,}758.52$

4.8% ÷ 4
1.2%
+ 100%
101.2%

Homework: pg. 479 #2, 4, 5, 8, 12, 14, 16, 18, 26-29