

Warm up

You deposit \$1500 in an account that pays 8% interest compounded yearly. Find the balance for the given time period.

$$y = C(1+r)^t$$

a) 5 years

$$y = 1500(1 + .08)^5$$

$$\approx 2203.992 \dots$$

$$\text{\$ } 2203.99$$

b) 10 years

$$y = 1500(1 + .08)^{10}$$

$$\approx 3238.387$$

$$\text{\$ } 3238.39$$

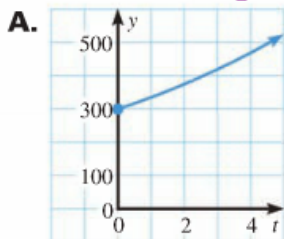
Homework

EXPONENTIAL GROWTH MODELS Match the description with its graph.

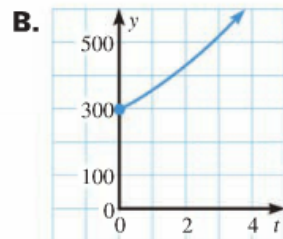
37. $C = \$300$ $r = 6\%$

38. $C = \$300$ $r = 12\%$

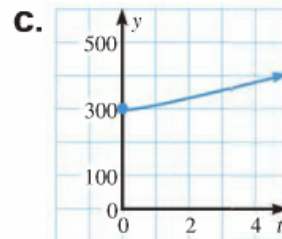
39. $C = \$300$ $r = 20\%$



12%



20%



6%

GROWTH RATES AND FACTORS Identify the growth rate and the growth factor in the exponential function.

28. $y = 50(1 + 1)^t$

29. $y = 31(4)^t$

30. $y = 5.6(2.3)^t$

Rate = 1.3
Growth Factor : 2.3

$$\begin{array}{r} 1 + r = 2.3 \\ - 1 \\ \hline r = 1.3 \end{array}$$

Self Scoring Scale

4- I can *summarize* the concepts and explain it to others.

3- I can *apply* the concepts to answer questions correctly.

2- I can *apply* the concepts but with some *mistakes*.

1- I *need help* to know how to apply the concepts.

0- I *can't* apply the concepts even with help.

8.7 Exponential Decay Functions

Goals: • Write and graph exponential growth functions

EQ: What is the difference between growth and decay?

The Unit Organizer

NAME _____
DATE _____ Mo/Date/Year

④ BIGGER PICTURE Algebra 1.5 Concepts

② LAST UNIT/Experience Systems

① CURRENT UNIT Exponents & Exponential Functions

③ NEXT UNIT/Experience Quadratics

⑧ Student Activities or Assignments

⑤ UNIT MAP

⑥ UNIT RELATIONSHIPS

⑦ UNIT SELF-TEST QUESTIONS

⑧ Student Activities or Assignments

8.1
8.2
8.3
8.4
8.5
8.6
8.7

⑦ UNIT SELF-TEST QUESTIONS

1. What properties can be used to simplify & evaluate exponential expressions?
2. What do exponential graphs look like?
3. Can you write numbers in both decimal form and in scientific notation?
4. How can exponential growth and decay equations be used to represent and solve real world problems?

Simplify
Graph
Apply
Represent

⑥ UNIT RELATIONSHIPS

Vocabulary

Exponential decay:

a quantity that is decreasing at the same % each time period

Decay rate:

$$y = C(1 - r)^t$$

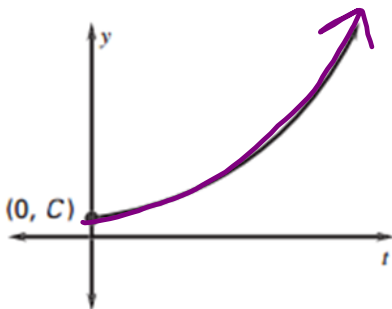
Handwritten annotations:
 Total Balance → C
 Begin ↓
 Rate ↑
 % → Dec.
 time → t

Decay factor:

In the () $(1 - r)$
 < 1 Less than 1

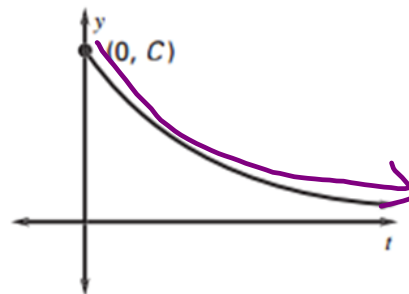
EXPONENTIAL GROWTH MODEL

$$y = C(1 + r)^t, \text{ where } 1 + r > 1 \text{ and } t \geq 0$$



EXPONENTIAL DECAY MODEL

$$y = C(1 - r)^t, \text{ where } 0 < 1 - r < 1 \text{ and } t \geq 0.$$



Bigger % → Steeper

Example 1: Write an Exponential Decay Model

Cars - A car is purchased for \$20,000. You expect the car to depreciate (lose value) at a rate of 25% per year. Write an exponential decay model to represent this situation. Then find the value of the car after 5 years.

$$y = 20000(1 - 0.25)^t$$

$$y = 20000(0.75)^5$$

$$\approx 4746.09375$$

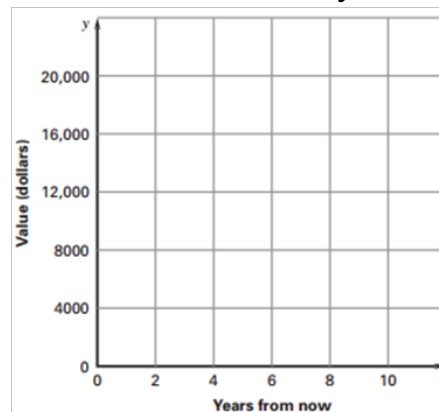
$$\$4746.09$$

Example 2: Graph an Exponential Decay Model

Graph the exponential decay model in Example 1. Then use the graph to estimate the value of the car after 7 years.

Cars - A car is purchased for \$20,000. You expect the car to depreciate (lose value) at a rate of 25% per year. Write an exponential decay model to represent this situation. Then find the value of the car after 5 years.

t	0	2	4	6	8
y					



Try It

A boat costs \$3200. The value of the boat depreciates at the rate of 13% per year.

1. Write an exponential decay model to represent this situation.

$$y = 3200(1 - .13)^t$$

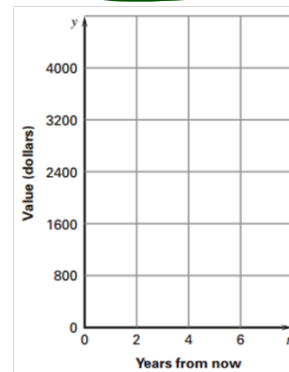
2. Use the model to find the value of the boat after 3 years.

$$y = 3200(1 - .13)^3$$

$$\approx 2107.209$$

\$2107.21

3. Graph the exponential decay model. From the graph, estimate the value of the boat after 5 years.



Summary

EQ:

Growth \uparrow $y = c(1+r)^t$

Decay \downarrow $y = c(1-r)^t$

8.7 Homework

8.7 p.485 #1-6, 22-30, 42-43