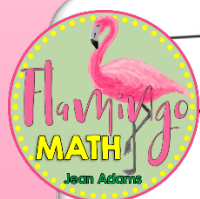
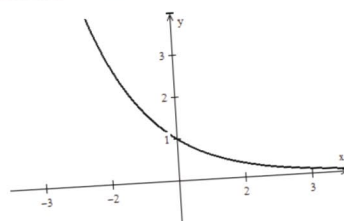
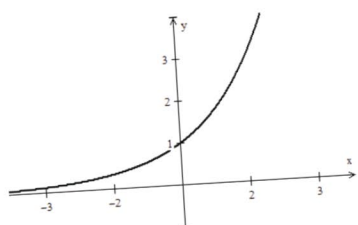


Algebra 2 Honors

Exploring Exponential Models



Characteristics of Exponential Graphs

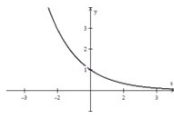
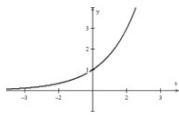


Domain:	$(-\infty, \infty)$	all reals
Range:	$(0, \infty)$ $y > 0$	all positive reals
Asymptotes:	$y = 0$	the x-axis
Key Points:	$(0, 1)$ y-intercept	no x-intercept

Completely Editable

7.1

Lesson 7: Exploring Exponential Models



Vocabulary

Definition

Exponential function

Exponential growth

Growth factor

Exponential decay

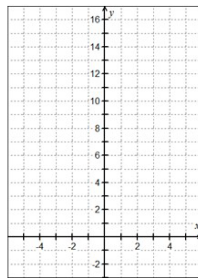
Decay factor

Asymptote

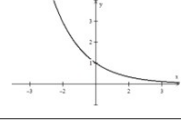
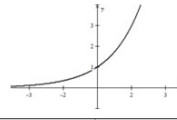
Graphing an Exponential Function

EX #1: Graph $y = 2^x$

x	2^x	y
-2		
-1		
0		
1		
2		
3		



Characteristics of Exponential Graphs



Domain:

Range:

Asymptotes:

Key Points:

Identifying Exponential Growth & Decay

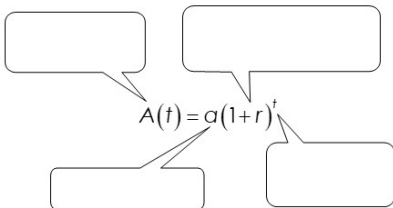
EX. #2: Identify each of the following as an example of exponential growth or decay. Explain how you know. What is the y-intercept?

A. $y = 3(4^x)$

B. $y = 11(0.75^x)$

C. You save \$2000 into a college savings account for four years. The account pays 6% interest annually.

Modeling Exponential Growth



EX. #3: Suppose you invest \$500 in a savings account that pays 3.5% annual interest. How much will be in the account after five years?

EX. #4: If you invest your \$500 in a savings account that pays 3.5% annual interest, when will the account contain at least \$1500?

Writing an Exponential Function

EX. #5: The table shows the world population of the Iberian lynx in 2003 and 2004. If the population is decreasing in an exponential manner and the trend continues, how many Iberian lynx will there be in 2014?



World Population of Iberian lynx		
Year	2003	2004
Population	150	120

Source: WWF Global

Write the model as $y = ab^x = a(1+r)^x$

$$r = \frac{y_2 - y_1}{y_1}$$

$$b = (1+r)$$

NOTES

Name _____ Date _____

7.1

Exponential Functions Practice

Problems 1 – 4, determine the exact value of the function without using a calculator.

1. $f(x) = 5 \cdot 4^x$ for $x = -1$

2. $g(x) = -3 \cdot 2^x$ for $x = 5$

3. $h(x) = 6\left(\frac{1}{2}\right)^x$ for $x = 3$

4. $f(x) = -2 \cdot 5^x$ for $x = -2$

Problems 5 – 8, without graphing, determine whether the function represents exponential growth or exponential decay. Find the y -intercept.

5. $y = 142(1.38)^x$

6. $f(x) = 0.7\left(\frac{1}{5}\right)^x$

7. $g(x) = 2\left(\frac{3}{8}\right)^x$

8. $f(x) = 3^{-x}$

Problems 9 – 12, for each function, find the annual percent increase or decrease that the function models.

9. $f(x) = 0.75(1.015)^x$

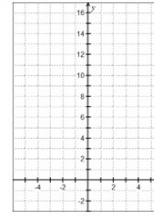
10. $g(x) = 18243(1.54)^x$

11. $P(t) = 164000(0.025)^x$

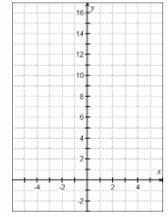
12. $y = 8\left(\frac{1}{4}\right)^x$

Problems 13 – 16, graph each function.

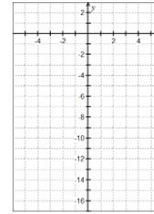
13. $y = 0.5(2)^x$



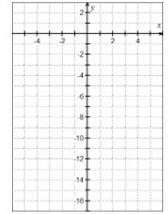
14. $y = 2(5)^x$



15. $y = -0.5(2)^x$



16. $y = -2(0.5)^x$



Problems 17 – 20, write an exponential function $y = ab^x$ for a graph that includes the given points.

17. $(0, 3), (3, 24)$

18. $(-1, 18), \left(3, \frac{2}{9}\right)$

19. $(2, 0.8), (-1, 12.5)$

20. $\left(-2, \frac{4}{3}\right), (10, 173)$

Problems 20 – 23, write an exponential function that models each scenario. Then use it to solve the question.

20. A new sports car sells for \$35,000. It depreciates 22% every year. What is the value of the car after 4 years?

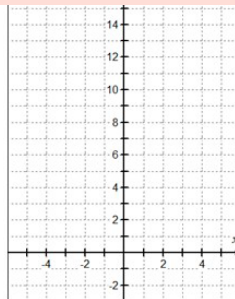
21. You have \$15,000 to invest in a retirement account. The fund increases at a rate of 10.8% per year. What will be the value of the investment at the end of 30 years?

22. A population count of 1246 black bears were found in a region of North Carolina. The population has been increasing at a rate of 2.25% per year. If this growth rate continues, how many bears will populate the region in 5 years?

Practice Sets

Lesson Warm-Ups

-3		
-2		
-1		
0		
1		
2		



Name _____ Date _____ Period _____

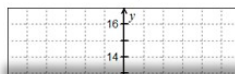
Lesson 7.1: Exploring Exponential Models

Warm-Up #2

1. Complete the table of values.

x	$0.5(2)^x$	y
-1		
0		
1		
2		
3		
4		

2. Graph the function from your table.

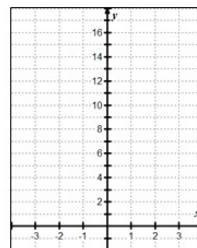


7.1 Exploring Exponential Models Form A

Name _____

Date _____ Period _____

1. Graph: $y = 2^x$



$$A(t) = a(1+r)^t$$

2. Using the exponential model above, write an exponential function to model a population of 750,000 zebras decrease at a rate of 2.6% each year for 8 years.

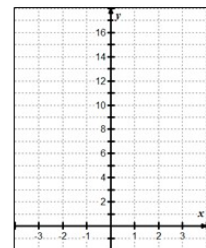
3. Find the population of the zebras at the end

7.1 Exploring Exponential Models Form B

Name _____

Date _____ Period _____

1. Graph: $y = 2^{-x}$



$$A(t) = a(1+r)^t$$

2. Using the exponential model above, write an exponential function to model a population of 120,000 giraffes increase at a rate of 1.2% each year for 5 years.

3. Find the population of the giraffes at the end

Daily Lesson Quiz

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