Book and homework on your desk.

You will have 10 minutes to read HF.


10 MINUTES

Announcements

Exponents tests returned soon

HF through Chapter 6 must be completed by Monday

Test Wednesday, 2/20

Unit Map

~~Thursday, 2/7/2019 → Transformations of functions~~
~~Friday, 2/8/2019 → Ms. Barger Absent, Hidden Figures reading and work~~
Monday, 2/11/2019 → Exponential Growth and Decay
Tuesday, 2/12/2019 → Compound Interest and Half Life
Wednesday, 2/13/2019 → Transformations of Exponentials
Thursday, 2/14/2019 → Scientific Notation converting back and forth
Friday, 2/15/2019 → Scientific Notation adding and subtracting & multiplying and dividing
Monday, 2/18/2019 → Scientific Notation word problems
Tuesday, 2/19/2019 → Review
Wednesday, 2/20/2019 → **Exponents Test 2**

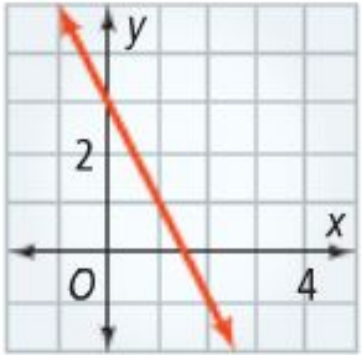
Warm-Up

46. A new fitness center opens with 120 members. Every month the fitness center increases the number of members by 40 members. How many members will the fitness center have after being open for 3 months?

47. What is the slope of the line at the right?

48. What is the simplified form of 8^0?

49. What is the simplified form of 5^{-2}?



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45. Answers may vary. Sample:
$f(x) = 10(0.8)^x$ and $g(x) = 80(0.4)^x$

46. 240

47. -2

48. 1

49. $\frac{1}{25}$

Homework Review

Exponential Growth and Decay

2/11/2019

What is an exponential function?

http://study.com/academy/lesson/what-is-an-exponential-function.html

Exponential Growth

$y = a \cdot b^x$ and $a>0$ and $b>1$

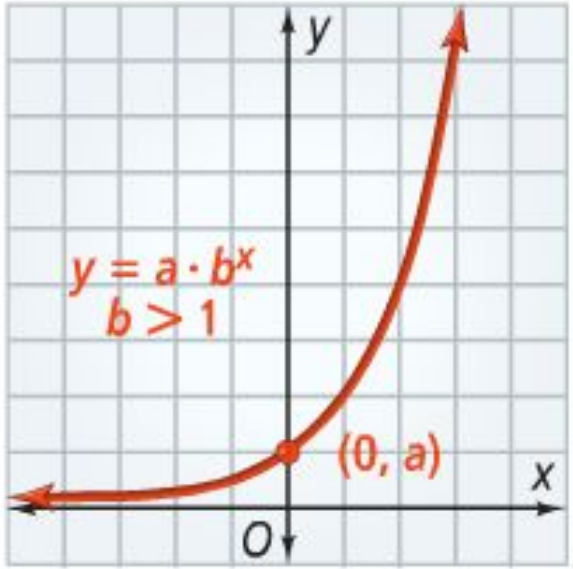
The base, b, is the growth factor which equals 1 plus the percent rate of change expressed as a decimal.

initial amount (when $x = 0$)

$y = a \cdot b^x$ ← exponent

The base, which is greater than 1, is the growth factor.

Graph



Economics Since 2005, the amount of money spent at restaurants in the United States has increased about 7% each year. In 2005, about $360 billion was spent at restaurants. If the trend continues, about how much will be spent at restaurants in 2015?

Economics **Since 2005, the amount of money spent at restaurants in the United States has increased about 7% each year. In 2005, about $360 billion was spent at restaurants. If the trend continues, about how much will be spent at restaurants in 2015?**

$y = a \cdot b^x$ Use an exponential function.

Let x = the number of years since 2005.
Let y = the annual amount spent at restaurants (in billions of dollars).
Let a = the initial amount spent (in billions of dollars), 360.
Let b = the growth factor, which is $1 + 0.07 = 1.07$.

$y = 360 \cdot 1.07^x$

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$y = 360 \cdot 1.07^x$ Use the equation to predict the annual spending in 2015.

$$\begin{aligned} y &= 360 \cdot 1.07^x \\ &= 360 \cdot 1.07^{10} && \text{2015 is 10 yr after 2005, so substitute 10 for } x. \\ &\approx 708 && \text{Round to the nearest billion dollars.} \end{aligned}$$

About $708 billion will be spent at restaurants in the United States in 2015 if the trend continues.

You try!

Suppose the population of a town was 25,000 people in 2000. If the population grows about 1.5% each year, what will the approximate population be in 2025?

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2. $4489.01

Example 1: In 1971, there were 294,105 females participating in high school sports. Since then, that number has increased an average of 8.5% per year.

a) Write an equation to represent the number of females participating in sports since 1971.

b) How many females participated in high school sports in 2008?

Example 2: The population of Johnson City in 1995 was 25,000. Since then, the population has grown at an average rate of 3.2% each year.

a) Write an equation to represent the population of Johnson City since 1995.

b) According to the equation, what will the population of Johnson City be in the year 2020?

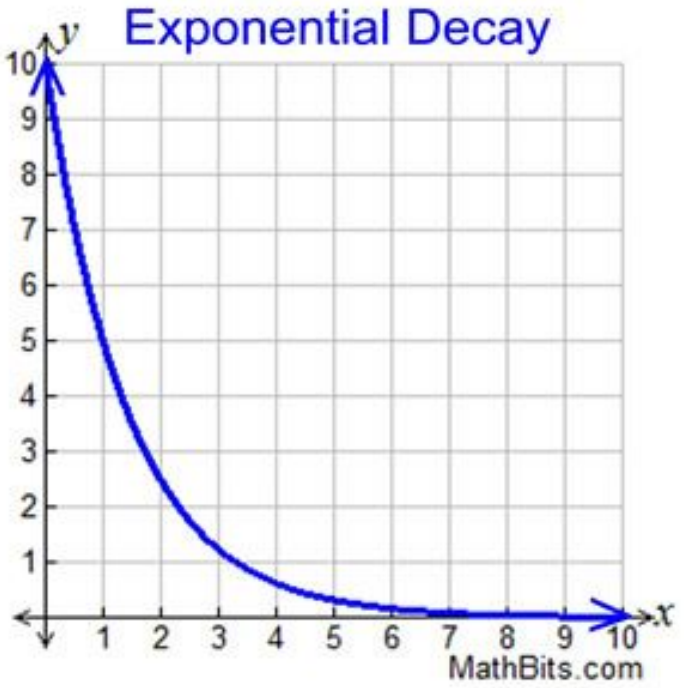
Exponential Decay

$y = a \cdot b^x$ and $a>0$ and $0<b<1$

The base, b, is the decay factor which equals 1 minus the percent rate of change expressed as a decimal.

initial amount (when $x = 0$)

$$y = a \cdot b^x \leftarrow \text{exponent}$$



Physics The kilopascal is a unit of measure for atmospheric pressure. The atmospheric pressure at sea level is about 101 kilopascals. For every 1000-m increase in altitude, the pressure decreases about 11.5%. What is the approximate pressure at an altitude of 3000 m?

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Let x = the altitude (in thousands of meters).
Let y = the atmospheric pressure (in kilopascals).
Let a = the initial pressure (in kilopascals), 101.
Let b = the decay factor, which is $1 - 0.115 = 0.885$.

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Use the equation to estimate the pressure at an altitude of 3000 m.

$$y = 101 \cdot 0.885^x$$
$$= 101 \cdot 0.885^3 \quad \text{Substitute 3 for } x.$$
$$\approx 70 \quad \text{Round to the nearest kilopascal.}$$

The pressure at an altitude of 3000 m is about 70 kilopascals.

Example 4: The original price of a tractor was $45,000. The value of the tractor depreciates (decreases in value) at a steady rate of 12% per year.

a) Write an equation to represent the value of the tractor since it was purchased.

b) What is the value of the tractor in 5 years?

Example 5: A new Honda Civic costs $18,000 in 2009. It is expected to depreciate in value by 12% each year. How much will the car be worth in 2015?

Determining Growth or Decay

To determine exponential growth or decay, you must look at the "b" value.

a) Does the function $y=295(1.35)^t$ represent exponential growth or decay? What is the rate of growth or decay?

b) Does the function $y=3(0.72)^t$ represent exponential growth or decay? What is the rate of growth or decay?

Homework

Page 459 # 9 - 13 odd, 25-31 odd, 32, 33, 36-39