Warmup 11/ (*XVII*)

Mental Monday

Estimate: How many cheeseballs are in the container?

A number that is too high: _____

A number that is too low: _____

Your guess: _____

N180.com

Exponential Growth Functions

Write an Expression for the Situation.

Annual sales for a company are $149,000 and are increasing at a rate of 25% per year.

Write an Expression for the Situation

The original value of a painting is $1400, and the value increases by 9% each year.

Write an Expression for the Situation

The cost of tuition at a college is $12,000 and is increasing at a rate of 6% per year.

A condo in Austin, Texas, was worth $80,000 in 1990. The value of the condo increased by an average of 3% each year. Write a function to model this situation. Then find the value of the condominium in 2005.

$$y = 80{,}000(1.03)^x; \$124{,}637$$

Twelve students at a particular high school passed an advanced placement test in 2000. The number of students who passed the test increased by16.4% each year thereafter. Write a function to model this situation. Find the number of students who passed the test in 2004.

$$y = 12 \ (1.164)^x \ ; \ 22$$

Interpret the equation.

- If **x** is the number of months that have gone by after it was bought, the value of a baseball card is given by the function **f(x) = 5(1.125)^x**.

- Use the equation to describe what is happening with the value of the baseball card.

Science Application!

- In the absence of predators, the natural growth rate of rabbits is 4% per year. A population begins with 100 rabbits. The function $f(x) = 100 \, (1.04)^x$ gives the population of rabbits in x years.

- About how long will it take the population of rabbits to double?
- About how long will it take the population of rabbits to reach 1000?

Wally's Warehouse was founded in 2001. In 2004, there were 216 employees that worked there. In 2005, there were 324 employees that worked there.

1. **If the number of employees is increasing <u>exponentially</u>, how many employees will there be in 2006?** 486

2. **How many employees were there at the start in 2001?** 64

3. **Write an exponential equation that models the number of employees over the years.** $y=64(1.5)^x$

Exponential Decay

The fish population in a local stream is decreasing at a rate of 3% per year. The original population was 48,000. Write a function to model this situation. Find the population after 7 years.

$$y = 48{,}000\ (0.97)^x;\ 38{,}783$$

The population of a small Midwestern town is 4500. The population is decreasing at a rate of 1.5% per year. Write a function to model this situation. Then find the number of people in the town after 25 years.

$y = 4500(0.985)^t; 3084$

Real Life Application!

Ms. Bolus purchased her car for $11600. It is **_depreciating_** at a rate of 12% per year. Mr. Lischwe purchased his car for $9700. It is **_depreciating_** at a rate of 7% per year. Write a function to model both situations.

Bolus	$f(x) = 11600(.88)^x$
Lischwe	$f(x) = 9700(.93)^x$

Real Life Application!

-How much is each car worth 2 years from now?   B: $8983.04 L: $8389.53

-In how many years will Mr. Lischwe's car be worth more than Ms. Bolus' car?

4 years

Bolus	$f(x) = 11600(.88)^x$
Lischwe	$f(x) = 9700(.93)^x$

Homework

- Worksheet