

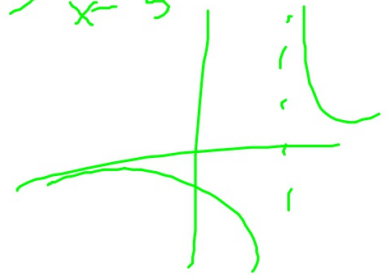
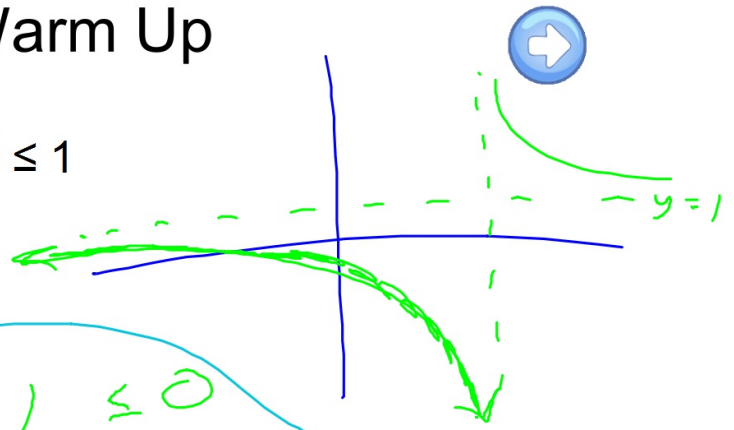
Warm Up

Solve the inequality $\frac{x+6}{x-5} \leq 1$

$$x < 5$$

$$\frac{x+6}{x-5} - 1 \leq 0$$

$$\frac{x+6 - 1(x-5)}{x-5} \leq 0 \rightarrow \frac{11}{x-5} \leq 0$$



Objective: SWBAT model a situation with an exponential function and use it to solve problems.

Agenda:

- Warm Up
- Notes
- Practice
- Reflection

$$y = a \cdot b^x$$

HW: Word Problem Practice
#1-10

Notes: Compound Interest

Recall the fact that, for interest compounded at intervals,

$$A = P(1 + r/n)^{nt}$$

A = the final amount

P = the initial amount

r = the rate of growth/decay as a decimal

n = number of times compounded per year

t = time in years

If my car is worth \$23,000 now and depreciates at a rate of 15% per year,

- a. What is an expression modeling the resale price t years from now?

$$\begin{aligned} A &= 23,000 \left(1 + \left(\frac{-0.15}{1} \right) \right)^t \\ &= 23,000 (0.85)^t \end{aligned}$$

- b. How much will my car be worth in 5 years?

$$A = 23,000 (0.85)^5 \approx 10,205 \quad t = 5$$

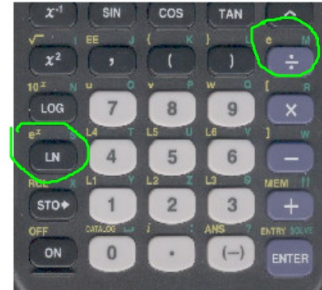
Notes: Continuous Compound Interest

For things that grow or decay continuously (not at intervals),

$$A = Pe^{rt}$$

where e is a number.

This form is often used for things like populations (of people, bacteria, etc.) and radioactive decay



key words:
continuous,
population, no #
times
compound

Example

A town's population is currently 57,291 and is growing at an average rate of 7.36% per year.

- a. Find an equation for the population $P(t)$ after t years.

$$A = 57,291e^{(.0736(t))}$$

- b. What will the town's population be after 10 years?

$$A = 57,291e^{(.0736(10))}$$

$$A = 119,598.88 \approx 119,599 \text{ people}$$

Practice

"Unit 4 Day 4 Exponential Models"
handout

$$5 = 2(b)^6$$

$$\frac{5}{2} = b^6$$

$$b = \sqrt[6]{\frac{5}{2}}$$

Reflection

How is continuous compound interest useful as a concept?