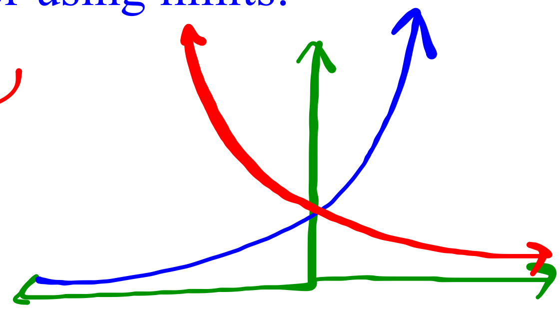
Review

Describe the end behavior using limits:

$f(x) = 2^{-3x}$ Decay

$\lim_{x \to -\infty} f(x) = \infty$

$\lim_{x \to \infty} f(x) = 0$



$f(x) = .85^{-x}$ Growth

$\lim_{x \to -\infty} f(x) = 0$

$\lim_{x \to \infty} f(x) = \infty$

Word Problems

1. Tell yourself: "I CAN do this" "I'm a Boss"
2. Read the problem [All of the words]
3. Determine what ? the problem wants you to answer.
4. Find (List) given information
5. Use given information to solve problem

3.2 Exponential Modeling

1 : 100% <1 Decrease >1 Increase

What is the initial value and percent of increase or decrease?

$f(x) = 52 \cdot 1.15^x$ Iv: 52 increase 15%

$f(x) = 5 \cdot .85^x$ Iv: 5 decrease 15%

$f(x) = a_0 \cdot b^x$

$f(x) = a_0 \cdot (1 \pm r)^x$

When looking at percent increase or decrease - the base is expressed as 100% + or - the % change.

$f(x) = 2 \cdot .73^x$

Is this an increase or decrease?

By what %?

↓ 27%

The initial value is 4 and the population is increasing by 3%. Write an exponential equation.

$f(x) = 4 \cdot (1.03)^x$

When will the population reach 10?

$\boxed{10} = \boxed{4 \cdot (1.03)^x}$

Graph

$y = 10$ $y = 4 \cdot (1.03)^x$

Find intersection

≈ 30.9981

$$A = a_0 \bullet (b)^{\frac{t}{n}}$$

If you have the life cycle of a given behavior then use this formula.

A the amount after a given period of time

a_0 the initial amount

t time

n the life cycle of the behavior

b type of behavior (doubling, half life, etc.)

You have 5 grams of a substance that has a half life of 20 days.

$$A = a_0 \bullet (b)^{\frac{t}{n}}$$

$$A = 5 \cdot \left(\tfrac{1}{2}\right)^{t/20}$$

How much do you have in 15 days?

$$5 \cdot \left(\tfrac{1}{2}\right)^{15/20}$$

≈ 2.97 grams

When will you have less than 2 grams?

$$2 < 5 \cdot \left(\tfrac{1}{2}\right)^{t/20}$$

≈ 26.4 days

Atmospheric Pressure:

$$P(h) = 14.7 \bullet \left(\frac{1}{2}\right)^{\frac{h}{3.6}}$$

P pounds per square inch

h height in miles

14.7 initial pressure (sea level)

Exponential Regression

A process of fitting a set of data to an exponential equation.

	L1	L2
0	1900	76.2
10	1910	92.2
20	1920	106
30	1930	123.2
40	1940	132.2
50	1950	151.3
60	1960	179.3
70	1970	203.3
80	1980	226.5
90	1990	248.7
100	2000	281.4
	2003	290.8

Step 1: STAT → EDIT L1 & L2

Step 2: 2nd stat plot : turn plot 1 ON

Step 3: STAT → CALC → 0 EXPREG
2nd 1 (L1), 2nd 2 (L2),

Equation: VARS → Y VARS → Y1) ENTER

Compare the result with 2003.

EXPREG L1, L2, Y1