Bell Work **Grab your calculator.** 2/18/2015

Graph the following equations using your calc:

1. $y = (3)\left(\frac{1}{2}\right)^x$
2. $y = (1)(4)^x$
3. Next = Now x 2, Starting at 3

Test next Weds/Thurs

Exponential Functions

What have we covered this semester?

Exponential Growth/Decay

$Y = (\text{Starting Point})(\text{Rate})^{X}$

Calling Trees → Example of Exponential Growth

Properties of Exponents

$x^a x^b = x^{a+b}$	$(3x)^a = 3^a x^a$
$(x^a)^b = x^{a \cdot b}$	$x^0 = 1$
$\frac{x^a}{x^b} = x^{a-b}$	$x^{-a} = \frac{1}{x^a}$
$\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$	$\frac{1}{x^{-b}} = x^b$

Next = Now

Starting @

CALCULATORS

What have we covered this semester?

Properties of Exponents

$(x^a)^b = x^{ab}$	$\frac{x^a}{x^b} = x^{a-b}$
$x^a x^b = x^{a+b}$	$x^0 = 1$
$(3x)^a = 3^a x^a$	$\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$
$x^{-a} = \frac{1}{x^a}$	$\frac{1}{x^{-b}} = x^b$

Exponential Growth/Decay

$$y = (\text{Starting point})(\text{RATE})^x$$

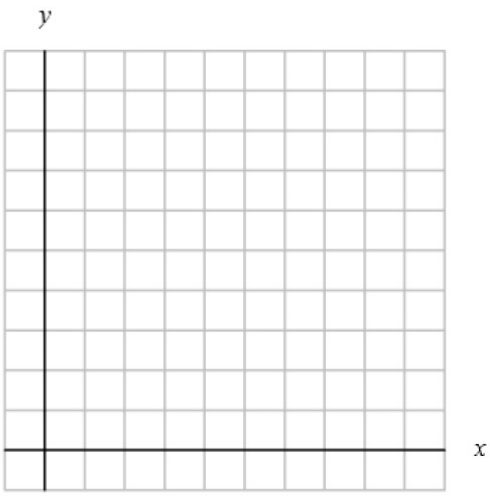
Calculators

Depreciation Investigation

Name _____

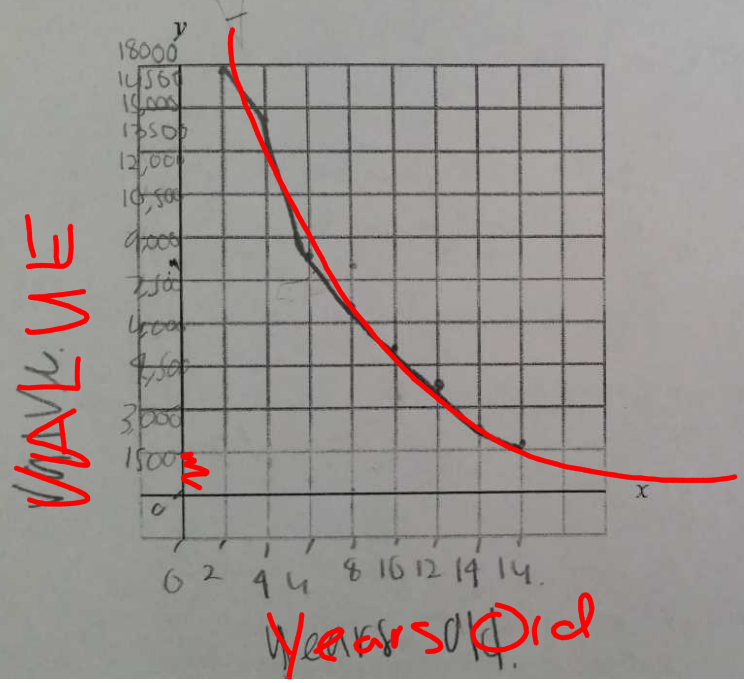
The price for the 2010 Ford Truck you would like to buy is $17,250. Suppose the car depreciates 12% each year. The table below models the relationship between the years the cars has depreciated and the value of the car.

Label your x and y-axis and choose an appropriate scale.



Years Old	*Value*
0	$17250
2	$13358
4	$10345
6	$8011
8	$6203
10	$4804
12	$3720
14	$2881
16	$2231

Label your x and y-axis and choose an appropriate scale.



Years Old	Value
0	$17250
2	$13358
4	$10345
6	$8011
8	$6203
10	$4804
12	$3720
14	$2881
16	$2231

Write your answers in complete sentence!!

1. As the number of years the car has depreciated increases what happens to the value of the car?

Decreases

2. How much did the value of the car decrease from year 0 to year 2? How much did the car decrease from year 2 to year 4? From year 4 to year 6?

0-2 $3,892 2-4 $3,013 4-6 $2,334

3. What kind of rate is the car depreciating at?

DECAY

4. What type of function would best model the depreciation of a vehicle? Linear, quadratic, or exponential? Explain your reasoning.

Multiply by the same # over and over

5. The **decay rate** is the percent at which the vehicle is decreasing by each year. What is the decay rate for the 2010 Ford Truck?

12% OR .12

6. The **growth factor** is the percent left after you subtract the decay rate from 100%. What is the growth factor?

88% OR .88

7. You can write an equation for the value of the car after x years $V(x) = a(b)^x$ where, *a* is the starting value and *b* is the growth factor. What is the equation for $V(x)$?

$V(x) = 17,250(.88)^x$

a.) How much is the car worth in 20 years? 30 years? 50 years? In the year 2110?

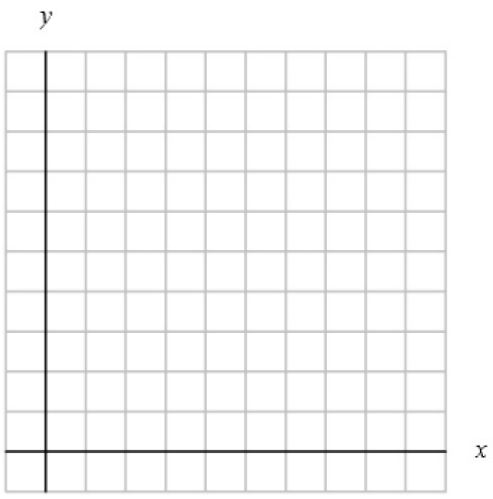
b.) Will the car ever reach a value of $0? Explain how this is shown by looking at the graph, table, in real-life.

Escalation Investigation

Name _____

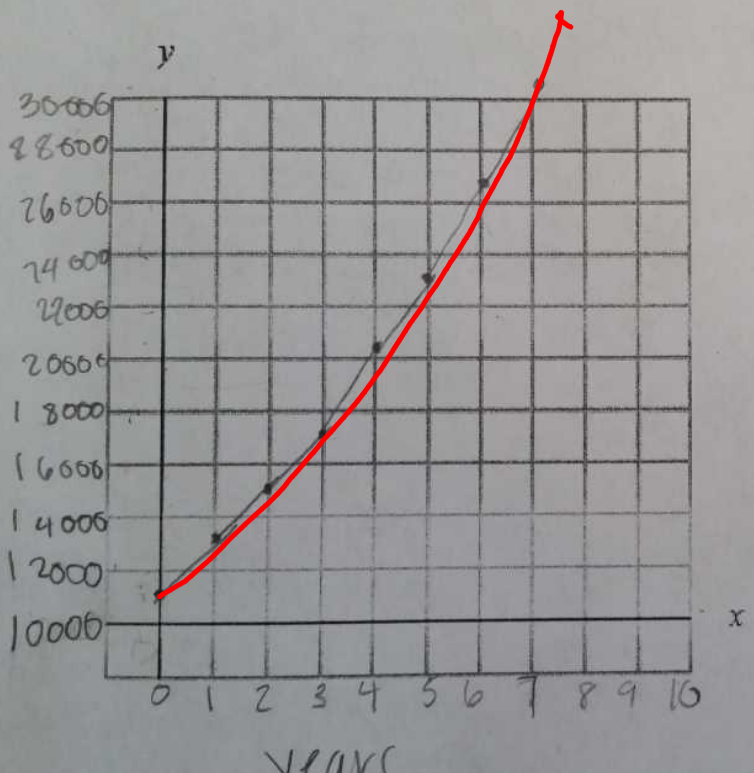
The population of deer in Jackson County has been on the increase for the past 10 years. In the year 2000 the population was at 11,572. Over time the population has increased at a rate of 15%. The table below models the relationship between the years since 2000 and the population of deer.

Label your x and y-axis and choose an appropriate scale.



Years After 2000	*Deer*
0	11,572
1	13,308
2	15,304
3	17,600
4	20,240
5	23,275
6	26,767
7	30,782

Label your x and y-axis and choose an appropriate scale.



Years After 2000	Deer
0	11,572
1	13,308
2	15,304
3	17,600
4	20,240
5	23,275
6	26,767
7	30,782

Write your answers in complete sentence!!

Write your answers in complete sentence!!

1. How much did the population of deer increase from year 0 to year 2? How much did the population increase from year 4 to year 6?

0-2 3,732

4-6 6,527

2. What is the rate of change the population is growing at?

15%.

3. What type of function would best model the escalation of a population? Explain your reasoning.

Exponential

4. The **growth rate** is the percent at which the population is increasing by each year. What is the decay rate for the Jackson County population of deer?

15%.

→ no decay

5. The **growth factor** is the percent left when you add the growth rate with 100%. What is the growth factor?

→ 115% OR 1.15

6. You can write an equation for the population of deer after x years using $V(x) = a(b)^x$ where, *a* is the starting value and *b* is the factor. What is the equation for $V(x)$?

$V(x) = 11,572(1.15)^x$

a.) What will be the population this year? In 20 years? In the year 2110?

b.) Could the population of deer have started at 0 deer? Explain how this is shown by looking at the table. Explain how this makes sense in real-life.