Lesson Title 6.1 Exponential Regression DAY TWO NOTES **Alg 2** **Date** _____

OBJECTIVE 5: Graphing Exponential Growth & Decay Functions

Remember all the parts you learned yesterday.

- What makes it growth or decay?
  - "b"-value: bigger than 1 = growth between 0 < b < 1 = decay
- Where do I start graphing?
  - Initial value "a" is the y-intercept on the graph
- What is an asymptote and where does it go?
  - The green "laser" always starts at y = 0 and shifts up or down with the graph

OBJECTIVE 6: Exponential Regression

Remember

- STAT
- Edit: L_1 = x values L_2 = y values
- STAT
- Calc Exp Reg

TASK 5: Complete the following information, fill the table, and graph the exponential function.

a) $y = 1(1.3)^x$

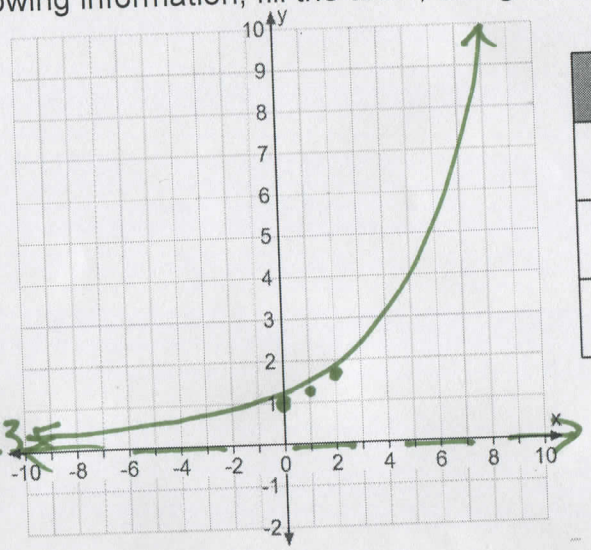
(Growth) Decay

Initial Value: a=1

y-intercept: (0,1)

(Growth)/Decay Factor: b=1.3

(Growth)/Decay Rate: r=0.3



X	Y
0	1
1	1.3
2	1.69

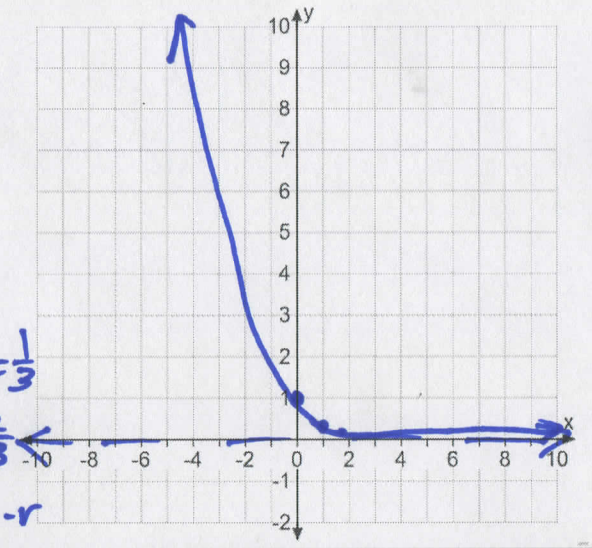
$b = 1 + r$

$1.3 = 1 + r$

$-1 \quad -1$

$0.3 = r$

b) $y = 1\left(\frac{1}{3}\right)^x$



Growth (Decay)

Initial Value: $a = 1$

y-intercept (0, 1)

Growth/Decay Factor: $b = \frac{1}{3}$

Growth/Decay Rate: $r = \frac{2}{3}$

$b = 1 - r$

$\frac{1}{3} = 1 - r \quad -\frac{3}{3} + \frac{1}{3} = -r$

X	Y
0	1
1	0.333
2	0.111

TASK 6: Use your calculator to create the exponential regression model for the given data.

a)

x	y
0	81
1	27
2	9
3	3
4	1

smaller

Growth (Decay) a: 81 b: $\frac{1}{3}$ or 0.333

decay rate (r): $\frac{2}{3}$ or 0.667

exponential equation: $y = 81\left(\frac{1}{3}\right)^x$

b)

x	y
1	13.2
2	29.04
3	63.888
4	140.555
5	309.22

bigger

(Growth) Decay a: 6 b: 2.200

decay rate (r): 1.200

exponential equation: $y = 6(2.2)^x$

CALC

STAT

Edit

$X \to L_1 \quad Y \to L_2$

STAT

Calc

ExpReg

TASK 7: Use your calculator to create the exponential regression model for the given data. Then use your function to predict for the given value. ExpReg

a) The data provided is from a large mouth bass population in a local pond, find the exponential equation that models this situation using exponential regression. **Let 0 represent the year 1970.**

(Growth) Decay a: 77.113

decay rate (r): 0.611 b: 1.611

exponential equation: $y = 77.113(1.611)^x$

Year	L_1 X	Population L_2
1972	2	200
1973	3	322
1974	4	519
1975	5	836
1976	6	1,346
1977	7	2,167
1978	8	3,490

b) Prediction:

Predict the population size of largemouth bass in the local pond for the year 1981.

x = 11 $y = 77.113(1.611)^{11} \approx 14627.784$

Find f(29). What year does x = 29 represent?

Pop. of 14,627 large mouth bass $y = 77.113(1.611)^{29}$

x = 29 year 1999

Notes to myself about the lesson that I do not want to forget:

- calc steps
- years use #s not years w/ a given start date
- $y = ab^x \rightarrow y = a(1 \pm r)^t$ + = growth − = decay

Still need help with: