Lesson 2: Exponential Relations: Data Analysis | Homework

(A) Lesson Context

BIG PICTURE of this UNIT:	• How can I analyze growth or decay patterns in data sets & contextual problems? • How can I algebraically & graphically summarize growth or decay patterns? • How can I compare & contrast linear and exponential models for growth and decay problems.		
CONTEXT of this LESSON:	Where we've been In Lesson 1, you generated data from a variety of activities	Where we are How do we analyze data in order to determine the patterns/relationships exist in data sets that exhibit growth & decay patterns	Where we are heading How can I develop equations that will help me make predictions about scenarios which feature exponential growth & decay?

(B) Lesson Objectives:

a. Generate data through various hands-on activities
b. Analyze the data to look for patterns in the data that was generated
c. Make predictions/extrapolations through numeric or algebraic analysis

Place a copy of your graphing calculator screen shots (or use your phone to take pictures of your calculator screens showing the scatterplot and the graph of the equation for the three HW questions	

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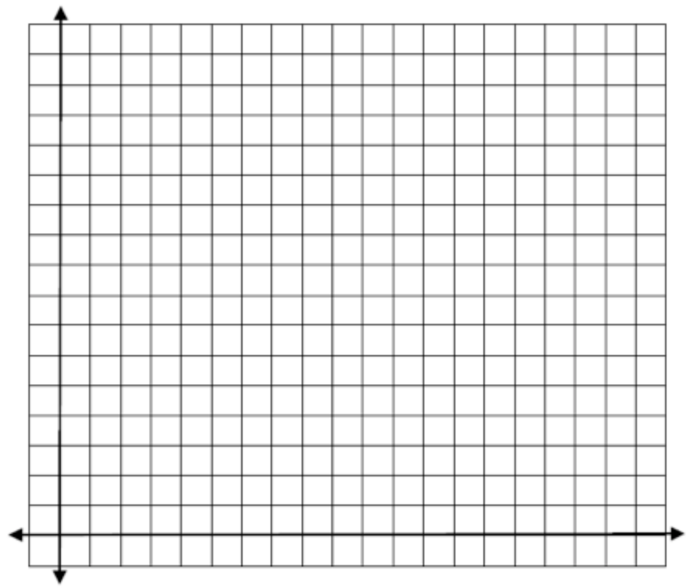
DATA ANALYSIS Q#1 ➔ The data collected by a biologist showing the growth of a colony of bacteria at the end of each hour are displayed in the table below.

Time, hour, (x)	Population (y)
0	250
1	330
2	580
3	800
4	1650
5	3000



MATH ANALYSIS ➔to calculate the common ratio, we will divide successive y values.

$ratio = \frac{y_2}{y_1} = \frac{y_3}{y_2} = \frac{y_4}{y_3} = \frac{y_5}{y_4}$ etc ...... ➔ so "b" = ??? Which leads to an equation in the form of $y = ab^x$

(A) Graph the data on the grid included above

(B) Write an exponential equation to model these data. Round all values to the nearest thousandth.

(C) Assuming your mathematical model (the equation you came up with) is correct, use this equation to estimate, to the nearest ten, the number of bacteria in the colony at the end of 2.75 hours.

(D) Assuming this trend continues, use this equation to estimate, to the nearest ten, the number of bacteria in the colony at the end of 7 hours.

VERIFICATION ➔ use the TI-84 calculator to verify our equation ➔ graph BOTH the data points and the equation ➔ take a photo of the graph & show me

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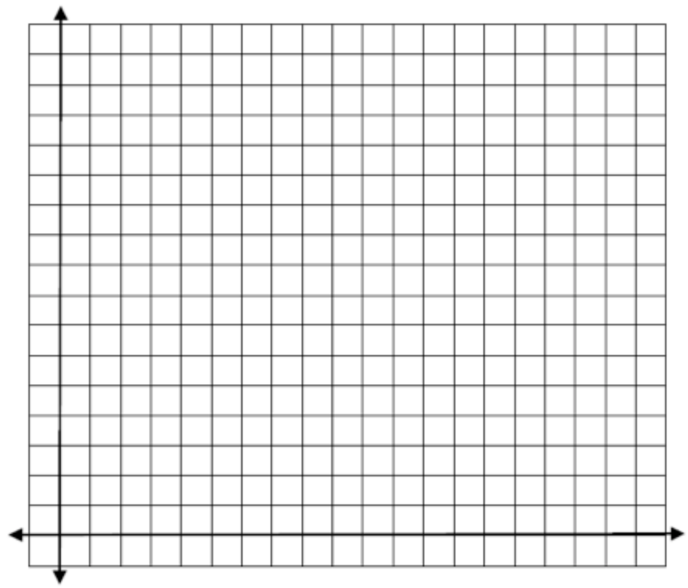
DATA ANALYSIS Q#2 ➔ Jean invested $380 in stocks. Over the next 5 years, the value of her investment grew, as shown in the accompanying table.

Years Since Investment (x)	Value of Stock, in Dollars (y)
0	380
1	395
2	411
3	427
4	445
5	462



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(A) Graph the data on the grid included above

(B) Write an exponential equation to model these data. Round all values to the nearest thousandth.

(C) Assuming your mathematical model (the equation you came up with) is correct, use this equation to estimate, to the nearest dollar, the value of her investment at the end of 1.5 years.

(D) Assuming this trend continues, use this equation to estimate, to the nearest dollar, the value of her investment at the end of 12 years.

VERIFICATION ➔ use the TI-84 calculator to verify our equation ➔ graph BOTH the data points and the equation ➔ take a photo of the graph & show me

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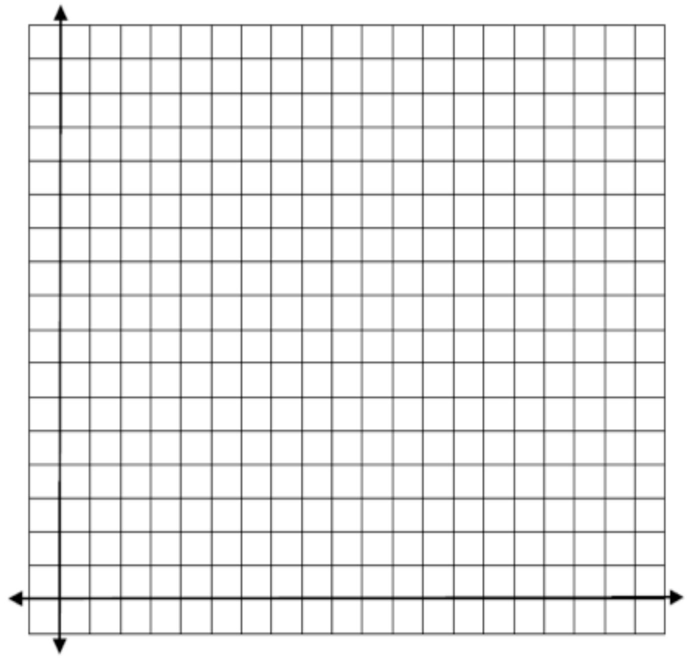
DATA ANALYSIS Q#3 ➔ The accompanying table shows the average salary of baseball players since 1984.

Baseball Players' Salaries

Numbers of Years Since 1984	Average Salary (thousands of dollars)
0	290
1	320
2	400
3	495
4	600
5	700
6	820
7	1,000
8	1,250
9	1,580



MATH ANALYSIS ➔to calculate the common ratio, we will divide successive y values.

$ratio = \frac{y_2}{y_1} = \frac{y_3}{y_2} = \frac{y_4}{y_3} = \frac{y_5}{y_4}$ etc ...... ➔ so "b" = ??? Which leads to an equation in the form of $y = ab^x$

(A) Graph the data on the grid included above

(B) Write an exponential equation to model these data. Round all values to the nearest thousandth.

(C) Assuming your mathematical model (the equation you came up with) is correct, estimate the salary of a baseball player in the year 1990, to the nearest thousand dollars.

(D) Assuming this trend continues, use this equation to estimate the salary of a baseball player in the year 2013, to the nearest thousand dollars.

VERIFICATION ➔ use the TI-84 calculator to verify our equation ➔ graph BOTH the data points and the equation ➔ take a photo of the graph & show me