

Exponential Regression

Name: _____ Date: _____

Complete this work using a spreadsheet and word editor. You can share this with your teacher in google classrooms. Show all of your work and your calculations.

1. A cup of soup is left on a countertop to cool. The table below gives the temperatures, in degrees Fahrenheit, of the soup recorded over a 10-minute period.

Time in Minutes, x	Temperature in $^{\circ}\text{F}$, y
0	180.2
2	165.8
4	146.3
6	135.4
8	127.7
10	110.5

- a) Calculate the temperature you would reach when 5 minutes has passed. Is this extrapolation or interpolation.
- b) Calculate the temperature you would reach when 15 minutes has passed. Is this extrapolation or interpolation?
- c) Estimate the time it would take the soup to reach 74°F (room temperature).
2. The table below shows the number of new stores in a coffee shop chain that opened during the years 1986 through 1994. Change 1986 to 0, 1987 to 1 and so on to get the model equation.

Year	Number of New Stores
1986	14
1987	27
1988	48
1989	80
1990	110
1991	153
1992	261
1993	403
1994	681

- a) Calculate the number of new stores expected in the year 2000. Be sure to convert this year to a time in years since 1986.
- b) Estimate when the number of new stores would be 1000.

3. 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

- a) Calculate the bacteria numbers after 10 hours.
 b) Estimate when the bacteria population would reach 2100.
4. 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

- a) Calculate the years you would need to invest to reach a value of 1000 dollars. Is this guaranteed? Explain.
 b) In what year would your initial investment be doubled?
5. A box containing 1,000 coins is shaken, and the coins are emptied onto a table. Only the coins that land heads up are returned to the box, and then the process is repeated. The accompanying table shows the number of trials and the number of coins returned to the box after each trial.

Trial	Coins Returned
0	1000
1	610
3	220
4	132
6	45

- a) Calculate the estimated number of coins returned after the 5th trial.