

Exponential Modeling/Regression

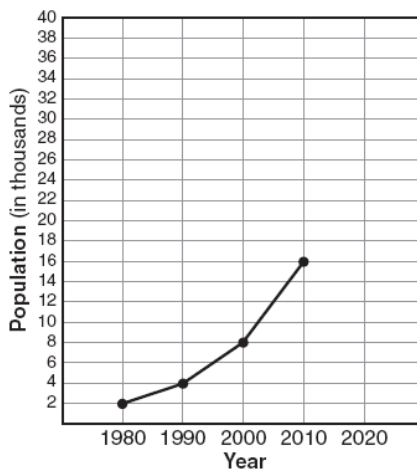
Name: _____

1) 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	0	1	3	4	6
Coins Returned	1,000	610	220	132	45

Write an exponential regression equation, rounding the calculated values to the *nearest ten-thousandth*. Use the equation to predict how many coins would be returned to the box after the eighth trial.

2) The population growth of Boomtown is shown in the accompanying graph. If the same pattern of population growth continues, what will the population of Boomtown be in the year 2020?



3) Jean invested \$380 in stocks. Over the next 5 years, the value of her investment grew, as shown in the accompanying table. Write the exponential regression equation for this set of data, rounding all values to *two decimal places*. Using this equation, find the value of her stock, to the *nearest dollar*, 10 years after her initial purchase. If Jean's investment was compounded annually, what was her interest rate?

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

4) The accompanying table shows the number of bacteria present in a certain culture over a 5-hour period, where x is the time, in hours, and y is the number of bacteria. Write an exponential regression equation for this set of data, rounding all values to *four decimal places*. Using this equation, determine the number of whole bacteria present when x equals 6.5 hours.

x	y
0	1,000
1	1,049
2	1,100
3	1,157
4	1,212
5	1,271

5) A chemist has a 250-gram sample of a radioactive material. She records the amount remaining in the same table every day for a week and obtains the following data. Use a linear, quadratic, and exponential regression to estimate the amount of material left after 10 days. Which regression models give a reasonable answer? Justify your answer.

Day	Weight (grams)
1	250
2	208
3	158
4	130
5	102
6	80
7	65