Name _____ Date _____

Mr. Schlansky Algebra I

Exponential Regression Equations

1. 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.

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

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 after 6.5 hours.

2. The accompanying table shows the amount of water vapor, y, that will saturate 1 cubic meter of air at different temperatures, x.

Amount of Water Vapor That Will Saturate 1 Cubic Meter of Air at Different Temperatures

Air Temperature (x) (°C)	Water Vapor (y) (g)
–20	1
–10	2
0	5
10	9
20	17
30	29
40	50

Write an exponential regression equation for this set of data, rounding all values to the *nearest thousandth*. Using this equation, predict the amount of water vapor that will saturate 1 cubic meter of air at a temperature of 50°C, and round your answer to the *nearest tenth of a gram*.

3. 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

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.

4. The following table represents the amount of student loan debt Dr. Ross has x years after 2010. Write an exponential regression equation to represent the amount of debt Ross will have left have left after x years. Round all coefficients to the *nearest thousandth*.
Assuming the pattern continues, in what year will Ross have $10,000 left in debt?

Years after 2010	Debt in Dollars
0	120,000
1	112,541
3	88,897
4	76,441
6	53,289

5. Consider the data in the table below.
State an exponential regression equation to model these data, rounding all values to the *nearest thousandth*. Use your equation to find x when y is 100, rounding to the *nearest tenth*.

x	1	2	3	4	5	6
y	3.9	6	11	18.1	28	40.3

6. A runner is using a nine-week training app to prepare for a "fun run." The table below represents the amount of the program completed, *A*, and the distance covered in a session, *D*, in miles.

Based on these data, write an exponential regression equation, rounded to the *nearest thousandth*, to model the distance the runner is able to complete in a session as she continues through the nine-week program. After how much of the program is completed will the runner complete 2.5 miles? Round your answer to the *nearest hundredth*.

A	$\frac{4}{9}$	$\frac{5}{9}$	$\frac{6}{9}$	$\frac{8}{9}$	1
D	2	2	2.25	3	3.25