**BA 355: Business Analytics, Case Study 2.2 (25 points)**

In this case study, we will use the credit score data from Case 2.1 to study how well Excel fits functions to data. Excel usually finds a *good* fit, but not necessarily the *best* fit. Use the data from the Case 2.2 Data file for exact results.

1) Calculate the loan default percentage for each credit score and then graph the percentages versus the credit scores. Adjust the x-axis so it starts at 300 instead of 0. Fit Excel’s automatic Exponential curve to the data and determine the equation and the r2 value. Include the graph here. It looks like a pretty good fit, no? **Yes**. You’ll need the coefficients and r2 for part 5) below so make a note of them. **Answers below.**

2) Now, use Solver to find the best fit. In other words, find the coefficients *a* and *b* for the equation $y=ae^{bx}$ that minimize the sum of the errors squared (unweighted). Calculate the r2 value too. Are these the same values you got in part 1)? **No, answers below.**

3) Now graph the data points versus this curve, making the curve look like a dashed line (so you can compare to the graph from part 1). Which of the two curves looks like a better “fit?” **I think red line is better.**

4) Repeat what you did in part 2) but now use the weighted sum of the errors squared, factoring in the number of loans for each credit score.

5) Fill in the table below with the coefficients and r2 values for each part:

|  |
| --- |
| $$y=ae^{bx}$$ |
|  | *a* | *b* | *r2* |
| 1) | **22.85** | **-0.010** | **98.3% (Actual)** |
| 2) | **11.33** | **-0.009** | **99.3%** |
| 4) | **15.06** | **-0.009** | **99.0%** |

We have now fit an exponential curve three different ways. Which one do you think is best, and why?

**I like last one because is factors in weights of data. But could argue for other two as well.**

6) How does Excel come up with the coefficients *a* and *b* in part 1)? Excel does not use Solver for this. Figure this out on your own or do a deep Google search, then explain it to me. **DO NOT SHARE this result with other students,** this question is supposed to separate the A’s from the A+’s; however, you are welcome, even encouraged, to compare your answers from 1) through 5).

**Excel takes the natural log (ln) of all the data then fits a straight line to it. Then reconverts to exponential by raising everything to ex. The ln(x) and ex functions are inverses of each other so this works pretty well, but not quite as well as using Solver. See Excel answer key for more details.**