MAT 1372 Statistics with Probability Hmwk 5/6 (counts for 2) Fall 2016

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| p. 54 # 2.5.1, 6; p. 128 # 3.7.1, 3 |
| p. 542# 12.2.1, 5; p. 548# 12.3.1, 2, 3  You may use http://www.dummies.com/howto/content/how-to-interpret-a-correlation-coefficient-r.html |

**2.5.1v.** In an attempt to determine the relationship between the daily midday temperature (measured in degrees Celsius) and the number of defective parts produced during that day, a company recorded the following data over 22 workdays.

**See Excel file for data**

**(a)** Draw a scatter plot using Excel without the trendline. Print it out and put in the trend line using a straight edge and pencil. Use your graph to find the slope and y-intercept. Now use Excel to put in trend line and R^2 value. Compare your graphs. Were your slope and y-intercepts close to what was given by Excel? (In Excel, do the calculations to find the equation using the 2 points you extracted from your hand-made line and write the equation there as well, but please upload a scan or a photo of the graph with the hand-made line itself.)

**(b)** What can you conclude from the scatter plot and the R^2 value?

**(c)** If tomorrow’s midday temperature reading were 24.0, what would your best guess be as to the number of defective parts produced? (Use the equation from the trendline feature of Excel.)

**2.5.6v.** During 8 years in the 1970s, it is suspected that the Feds set their lending rate based on the inflation rate.

The data in the Excel file provide the prime lending rates and the corresponding inflation rate during that period.

**(a)** Draw a scatter plot using Excel without the trendline. Print it out and put in the trend line using a straight edge and pencil. Use your graph to find the slope and y-intercept. Now use Excel to put in trend line and R^2 value. Compare your graphs. Were your slope and y-intercepts close to what was given by Excel? (In Excel, do the calculations to find the equation using the 2 points you extracted from your hand-made line and write the equation there as well, but please upload a scan or a photo of the hand-made line itself.)

**(b)** What can you conclude from the scatter plot and the R^2 value?

**(c)** Using the equation provided by trendline feature of Excel, predict the prime lending rate in a year whose inflation rate is 7.2 percent.

**3.7.1.** Explain why the sample correlation coefficient for the data pairs

(121, 360), (242, 362), (363, 364)

is the same as that for the pairs

(1, 0), (2, 2), (3, 4)

which is the same as that for the pairs

(1, 0), (2, 1), (3, 2)

**3.7.3v.** The data in the Excel file represent the IQ scores of 10 mothers and their eldest daughters.

**(a)** Draw a scatter plot without trendline or R^2 value

**(b)** Guess at the value of the sample correlation coefficient r and the R^2 value.

**(c)** Compute *r* (from the definition) and R^2.

**(d)** What conclusions can you draw about the relationship between the mother’s and daughter’s IQs?

**12.2.1.** The 12 data pairs Excel file relate *y*, the percentage yield of a laboratory experiment, to *x*, the temperature at which the experiment was conducted.

**(a)** Represent these data in a scatter plot.

**(b)** Do you think a simple linear regression model would be appropriate for describing the relationship between percentage yield and temperature?

**12.2.5.** The use that can be obtained from a tire is affected by the air pressure in the tire. A new type of tire was tested for wear at different pressures with the results provided in the Excel file.

**(a)** Plot the data in a scatter plot.

**(b)** Does a simple linear regression model appear appropriate for describing the relation between tire pressure and miles of use?

**12.3.1v. (a)** Find using the formulas (not built-in Excel) provided for B and A in class, the regression line for the data in the Excel file. Also use built in formulas for Excel (NOT the trendline feature).

**(b)** Use Excel to plot the scatter plot and regression line.

**(c)** Double all x-data values and repeat parts (a) and (b). What can you conclude?

**(d)** Double all y-data values and repeat parts (a) and (b). What can you conclude?

**12.3.2v** Verify the value given in Example 12.2 for the estimated regression via Excel, using the formulas provided in class, and not the built in formulas of Excel.

**12.3.3v.** The pairs of data in the Excel file represent the amounts of damages (in thousands of dollars) for fires at middle-class residences in a certain city and the distances (in miles) from these residences to the nearest fire station.

**(a)** Draw a scatter plot using Excel without the trendline. Print it out and put in the trend line using a straight edge and pencil. Use your graph to find the slope and y-intercept. Now use Excel to put in the trend line and R^2 value. Compare your graphs. Were your slope and y-intercepts close to what was given by Excel? (In Excel, do the calculations to find the equation using the 2 points you extracted from your hand-made line and write the equation there as well, but please upload a scan or a photo of the hand-made line itself.)

**(b)** Find the estimated regression line via Excel, using the formulas provided in class for B and A, and not the built in formulas of Excel. Compare it to the slope and y-intercept of the line drawn in part (a).

**(c)** Find the estimated regression line via Excel using the built in formulas (not the trendline).