MAT 1372 Statistics with Probability Hmwk 9 (counts for 2) Fall 2013

|  |
| --- |
| 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 |

**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 diagram 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?

**(b)** What can you conclude from the scatter diagram 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 provided by 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 diagram 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?

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

**(c)** Using the equation provided by 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 diagram 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 as well as 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 diagram.

**(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 diagram.

**(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, by a hand computation, the estimated regression line for the data in the Excel file. Also do the calculations in Excel using the formulas provided in the text and not the built in formulas of Excel.

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

**(c)** Double all the data values and repeat parts (a) and (b).

**12.3.2v** Verify the value given in Example 12.2 for the estimated regression via Excel, using the formulas provided in the text, 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) in 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 diagram without the trendline. Print it out.

**(b)** Try to approximate the relationship between the distance and damage by drawing a straight line through the data. Find the slope and y-intercept of the line.

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