AP Stats

4.1 WS #2 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The following data shows age compared to income:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age (yrs) | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| Income ($1000) | 18.5 | 23.6 | 29.8 | 38.5 | 49.0 | 64.1 | 78.5 | 102 | 130.8 |

1. Sketch a scatterplot of (age, income), then find the LSRL including correlation and coefficient of determination:
2. Sketch a residual plot and comment on whether the LSRL of (age, income) is a good fit
3. Perform an exponential transformation (age, log income) and sketch the scatterplot and find the LSRL including correlation and coefficient of determination:
4. Sketch a residual plot and comment on whether the LSRL of (age, log income) is a good fit
5. Perform a power transformation (log age, log income) and sketch the scatterplot and find the LSRL including correlation and coefficient of determination:
6. Sketch a residual plot and comment on whether the LSRL of (log age, log income) is a good fit
7. Determine which model is the best fit for the data. Transform data back to (age, income)…. Show your work. Then check your equation using ExpReg or Pwr Reg on your calculator:

2. The following data shows the number of police officers (in thousands) and violent crime rate (per 100,000 population) in a sample of states.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Police | 86.2 | 9.2 | 45 | 39.9 | 6 | 11.8 | 2.9 | 14.6 | 30.5 | 12.3 | 46.2 | 15.2 | 10.9 |
| Crime | 1090 | 559 | 1184 | 1039 | 303 | 951 | 132 | 763 | 635 | 726 | 840 | 373 | 523 |

Use this data to determine a model for prediction violent crime rate based on number of police officers employed. Show ALL scatterplots, residual plots, r, r2, comments, and transform the best equation back.