AFM Unit 11 **Linear Regression & Residuals** Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Day 1 Notes Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Definitions
2. Correlation Coefficient- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Coefficient of Determination- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Residuals- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

How to find the residual at each point: \_\_\_\_\_\_\_\_\_ - \_\_\_\_\_\_\_\_\_\_.

1. The numbers of insured commercial banks *y* (in thousands) in the United States for the years 1987 to 1996 are shown in the table. (Source: Federal Deposit Insurance Corporation).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
| *y* | 13.70 | 13.12 | 12.71 | 12.34 | 11.92 | 11.46 | 10.96 | 10.45 | 9.94 | 9.53 |

1. Find the linear regression for the data. Remember to turn your **diagnostic on.**

y = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. State the correlation coefficient & the coefficient of determination.

r = \_\_\_\_\_\_\_\_\_ R² = \_\_\_\_\_\_\_\_\_\_\_\_\_

1. Interpolate: What is the ***predicted*** number of insured banks in 1992?
2. Extrapolate: What is the ***predicted*** number of insured banks in 2002?
3. Approximately in what year were there 8.56 banks insured?
   1. Jamie, a meteorologist, is interested in finding a function that explains the relation between the height of a weather balloon (in kilometers) and the atmospheric pressure (measured in millimeters of mercury) on the balloon. She collects the data shown in Table 10.

Table 10

|  |  |  |  |
| --- | --- | --- | --- |
| Atmospheric Pressure, *p* | Height,*h* | Predicted Pressure | Residual |
| 760 | 0 |  |  |
| 740 | 0.184 |  |  |
| 725 | 0.328 |  |  |
| 700 | 0.565 |  |  |
| 650 | 1.079 |  |  |
| 630 | 1.291 |  |  |
| 600 | 1.634 |  |  |
| 580 | 1.862 |  |  |
| 550 | 2.235 |  |  |

Find the Linear Regression that models this data. Y = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Calculate the residual at each point and graph.

