**Notes**

1. The following table shows the length, in meters, of the winning long jump in the Olympic Games for the indicated year.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| Year | 1900 | 1904 | 1908 | 1912 |
| Length in meters | 7.19 | 7.34 | 7.48 | 7.60 |
| ARC | ---- |  |  |  |

1. Define the independent and dependent variables.
2. In order to reinitialize the data, create a row above “Year” that reads “years since 1900”.
3. Calculate the average rate of change between adjacent points and place the values in the third row of the above table. Do not round.
4. Can this data be modeled **exactly** by a linear function? Justify your answer.
5. Label the axes and plot the points on the graph below.



1. Do the data points fall **approximately** on a straight line?

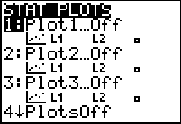
**Regression via TI-83/84 Calculator**

1. TO ENTER DATA:

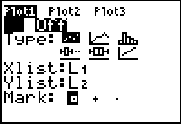
* Press the **STAT** key.
* Select Number **1:Edit…** and hit **ENTER**
* To clear list one (L1), scroll to the top of the list so that **L1** is selected, hit **CLEAR** and then **ENTER**. Do the same for list two if necessary.
* Under **L1**, enter the values for the independent variable.
* Under **L2**, enter the values for the dependent variable.
  + Make sure that there is the same number of entries in each column (otherwise you will get a DIM MISMATCH error later).

1. TO CREATE A SCATTERPLOT:

* Hit **2nd** **Y=**



* Select Number **1: Plot 1…** and hit **ENTER**



* To turn the Plot on, select **ON**
* Select the first **Type**
* Type **L1** into the **XList:**
* Type **L2** into the **YList:**
* Select the first **Mark**
* Hit **ZOOM**
* Select Number **9:ZoomStat** and hit **ENTER**
  + - NOTE: ZoomStat must be done EVERY TIME you change your data or your window will not fit the new data.

1. TO CALCULATE THE **LINEAR** REGRESSION EQUATION:

* Select **STAT**
* Move the cursor right to **CALC**
* Select Number **4: LinReg(ax +b)** and hit **ENTER**

1. Use your calculator to find the linear regression equation for the Olympic long jump data. Round to 3 decimals.
2. Graph the linear regression equation along with the scatterplot. Does the linear regression model fit the data well?
3. Interpret the vertical intercept in the context of the problemfrom the linear model found in **part g**.
4. Interpret the slope in the context of the problemfrom the linear model found in **part g**.
5. Using the model, determine the length in meters of the winning long jump in the Olympic Games in 2008.

**In-Class/Homework**

1. The accompanying table shows the annual mean personal income versus years of education

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Education (years)** | 1 | 4 | 6 | 8 | 9 | 11 | 12 | 14 | 16 | 18 | 20 |
| **Income (thousands of $)** | 9 | 11 | 15 | 19 | 21 | 19 | 29 | 31 | 50 | 70 | 100 |

1. Define the variables.
2. Find and write the linear regression function. Round to 3 decimals.
3. What is the slope of the linear model? Interpret the slope in context.
4. Identify the vertical intercept of the linear model. Interpret in the context of the situation. Does this make sense?
5. Graph a scatterplot of the data on your calculator as well as the function from **part b**.
6. Are there points that are not well represented by this linear regression function?
7. Does the linear regression model have a reasonable vertical intercept?
8. Find and write the model of an exponential function using regression (Select **0:ExpReg**). Round to 3 decimals.
9. What is the growth rate? Interpret the growth rate in context.
10. Graph the exponential function on your calculator with the scatterplot and the linear function. Is the linear regression model or the exponential regression model a better fit? Explain.