An Historic Look at Whale Oil –Follow up

Produced by Thomas J. Pfaff

Ithaca College

Use the right whale oil data to answer the following questions. Make sure you write down the appropriate units when recording your answers. On the back of this sheet are some calculator instructions.

1. Find a quadratic model to fit the data and put it in . Write down the model using three decimal places.

2. Find an exponential model to fit the data and put it in . Write down the model using three decimal places.

3. Which model should give a higher estimate for right whale oil production for 1860 and why? Now use each model to estimate the right whale oil production for 1860.

4. Use the exponential model to estimate the rate of change of whale oil production in 1845. If right whale oil production will continue to grow at this rate until 1860, then how much right whale oil production is predicted for 1860? Before doing this calculation here is a challenge question: Will this estimate be higher or lower than the values given in 3?

|  |  |
| --- | --- |
| Year | Right Whale Oil in Thousands of Gallons |
| 1817 | 581.8 |
| 1818 | 608 |
| 1819 | 1204 |
| 1821 | 1213.5 |
| 1822 | 1619.9 |
| 1823 | 1697.4 |
| 1824 | 1833.2 |
| 1830 | 2831.3 |
| 1831 | 3608.8 |
| 1833 | 5153.1 |
| 1834 | 4144.8 |
| 1835 | 3950.3 |
| 1836 | 4301.9 |
| 1837 | 6290 |
| 1838 | 7204.4 |
| 1839 | 7040.9 |
| 1840 | 6408.4 |
| 1841 | 6459.5 |
| 1844 | 8254.5 |
| 1845 | 11593.5 |

**Useful Key Stokes** To avoid rounding errors use to bring up the last answer on the calculator and use it for further calculations. It can sometimes save time to use , which bring up the last thing typed in the calculator (actually one can repeat this a number of times). So, instead of finding a formula in the catalog again just recall it if it was recently used.

**Function Evaluation/Using a**  To use a function for evaluation or other purposes press and then choose which of etc is needed.

**Data Entry-Lists Pressing**  gets one to the lists where data is entered. The lists have spreadsheet type capabilities. So for instance putting the curser at the top of and typing will result in evaluating each of the values of and placing them in or putting the curser at the top of and typing will multiply each row, subtract 10 and place the value in .

**Graphing Data-Scatter Plot** To make a scatter plot there must be data entered in to two lists, which are typically and . To check the setting of a plot press . Three plots can be created simultaneously but one is all that is typically done. Put the cursor on Plot1 and press ENTER. Here the plot can be turned on and off, a plot type can be selected (the first one is the scatter plot), the x list and y list data is chosen (typically and ) and the mark type (the first one is easiest to see). Plots can also be turned on and off in the Y= menu the same way function are turned on and off (place the cursor on the plot and press ENTER. To see a scatter plot press . To see 9ZoomStat on the screen scroll down. By selecting ZoomStat the calculator automatically sets the appropriate window.

• **ERR:DIM MISMATCH** This usually means that the data in the and column don’t match. One column has more data than the other.

• **ERR: INVALID DIM** Check the setting of the plot to see if the appropriate lists are being plotted. In other words, the x andy list are set at and . If this is ok, make sure that there is data in the two lists.

**Finding Models** Once data is in and and a scatter plot has been viewed, press . Scroll down and select and appropriate model. Once a model is selected on the main screen will need to add the lists and a place to put the model. All models have the same syntax so, for example, to fit data with a quadratic model the main screen should read QuadReg , , This tells the calculator that the x data is in , the y data is in and put the model in once it is made. The model will be put in and automatically turned on. Pressing GRAPH and the scatter plot will appear with the model.