Life Expectancy Graphs for Canadian Males and Females
When will the Average Canadian live to be 100?
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Downloading Statistics Canada Data to TI InterActive! & the TI-83
Calculating Linear Regression and doing Graphical Analysis

A. Make Connection to TI-83 (Plus)

1. Connect TI-GRAPH LINK cable to communication port and TI-83

2. In TI InterActive!, select in sequence: **Edit**>**Preferences**>**Communications**
   Set: a) calculator type
         b) com port
         c) TI-GRAPH Link cable type

B. Access Statistics Canada Website (from a computer connected to the Internet)

1. Select the TI InterActive! web browser by clicking the globe icon

2. Go to: www.statcan.ca

Click in sequence: **English**> **Canadian statistics** (in the top bar) > **Health** (under The People) > **Status** > **Life expectancy at birth**
Note: you can also go directly to the page at http://www.statcan.ca/english/Pgdb/Health/health26.htm

3. Use the mouse to highlight the data rows in the table for 1920 to 1990 for Canada

C. Download a Data Table from the StatCanada Canadian Statistics site (containing over 400 tables)

In the TI InterActive! browser click the **Extract** button at the top left of the screen. This downloads the selected data into the Data Editor in TI InterActive!

D. Name the Lists and Copy to TI InterActive! Document

1. In the Data Editor window, double click on the list names

2. Edit the list names to year, overall_life, male_life, female_life, difference

3. Edit all the cells in column 1 the year to reflect the beginning year of the decade e.g. 1920 , 1930, etc. to 1990

4. Click on the save icon (below File) to copy the list table into the TI InterActive! document.

E. Download from TI InterActive! to TI-83

1. Double click on the list table

2. In Data Editor, highlight lists to download by:

   Click first list name
   Hold Shift & click second list name

3. Select in sequence: **File> Export> to TI Calculator**

F.   Graphic Manipulation

1. Graph the life expectancy for males and females from 1920 to 2000 in TI InterActive! or your graphing calculator.

2. Calculate a linear regression (line of best fit) for the average life expectancy for males (male_life) and then for the average life expectancy for females (female_life). Include this line of best fit on your graph of life expectancy.

G. Graphic Manipulation Instructions to use in TI InterActive!

1. To graph the male life expectancy, double click on the Data editor.

     Control – click on the columns to be graphed, (year and male_life), then click on the **graph** icon (the icon with the scatterplot). This generates a scatter graph of male life expectancy over time.
     To add the graph for females, in the Function pop-up box, type the variables to be plotted (year, female_life)
    Customize the colours and type of graph. You can also add titles, and other labelling by clicking the **Format** button
    When done, save the graph back to your document.

2. To calculate the linear regression line for males, double click on the table to enter the Data Editor.

3. Control-click on the columns for the linear regression. This selects the appropriate data for the regression. Then select the **Stat Calculation tool**. Name the regression equation MaleEQ(x) so that you can graph it easily in the function editor.
    a)   Calculation type: - linear regression (ax + b)
    b)   Xlist – Year
    c)   Ylist – Male_Life
    d)   Frequency – must be blank
    e)   Regression equation - MaleEQ(x)

    Click the Calculate button at the bottom.

    Then enter a title and Save the results to your document

    Save the table back to your document.

4. Including the line of best fit on the graph.
    Double click on the Graph to bring up the Graph editor
    Click the **Functions** button and then the **f(x)** tab. Now type MaleEQ(x) as the function to be graphed.
        This plots the regression line on the existing graph.
        Note: you must use the exact name you used for storing the regression equation.
    Note: You can also enter the equation of the regression line calculated above by the Stat Calculation
    tool (e.g. y= .3071*x - 529.2)

1. Repeat the previous two steps for female life expectancy

2. Once this is done, answer the questions below.

Questions / Investigations

1) How accurately can we approximate life expectancy by a linear pattern using a linear regression?

2) a) Based on the regression line, in what year will the average life expectancy be 100 for females in Canada?

   b) Based on the regression line, in what year will the average life expectancy be 100 for males in Canada?

3) What will the average life expectancy be for a male and female born in 1985?

4) Using the formula for the linear regression, plug in any year and derive the average life expectancy for a person born in any year since 1920.

Other Investigations using *Canadian Statistics*

1. Greenhouse gas emissions.

   Click in sequence: **English**> **Canadian statistics** (in the top bar) > **Environment** (under The Land) > **Status** > **Life expectancy at birth**