# Function Plot

## Table of Contents

Principle ..... 1
Notation ..... 1
General Assignment ..... 2
Start Excel and Save File ..... 2
Label Spreadsheet Columns ..... 2
Enter Values of x for Evaluating Formula ..... 2
Enter the Formula to be Plotted ..... 3
Plot the Data ..... 5

## Principle

(Information) Suppose you want to plot the function given in Equation 1 for x between 1 and 30. Excel does not have the ability to plot an equation directly, but it can plot data. The strategy is to generate pairs of data using the function and have Excel plot the data.

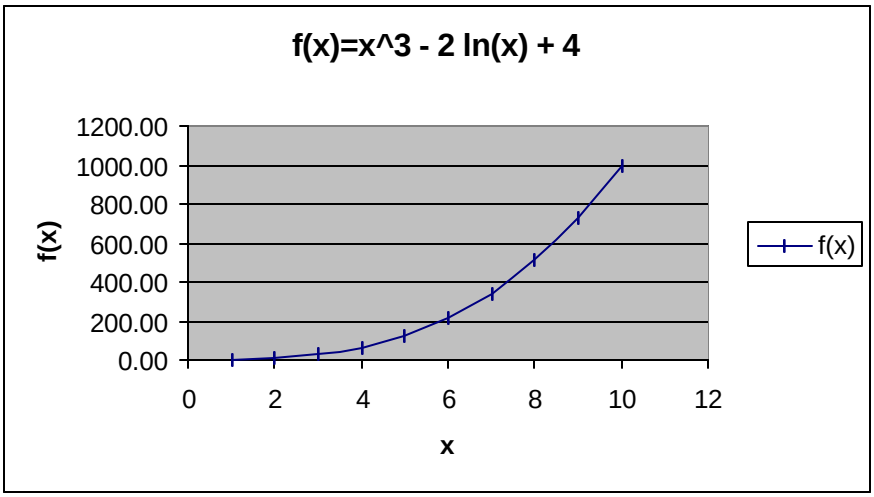
Decide on a practical interval for the independent variable x that will reveal the shape of the curve when f(x) is computed. Enter your selected values of x into Excel. Use Excel to compute the corresponding values of f(x). Use Excel to plot the pairs of (x,f(x)) using the Scatter Plot with lines fit to the plotted points. The following equation is plotted below as an example.

$$f(x) = x^3 - 2\ln(x) + 4$$ **Equation 1**

## Notation

(Information)
The multiplication sign is the asterisk (*).
The exponentiation sign is the up-caret (^).
In Excel, the right hand side of Equation 1 is written as: **x^3 – 2*LN(x) + 4**

| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| f(x) | 5.00 | 10.61 | 28.80 | 65.23 | 125.78 | 216.42 | 343.11 | 511.84 | 728.61 | 999.39 |




## General Assignment

(Information)

- Label two columns, x and f(x).
- Evaluate the following formula for x = 1, 2, …, 10. This formula is different than the one in the example above.

$$f(x) = 3x^2 + \ln(x) + 1$$ **Equation 2**

## Start Excel and Save File

(Procedure)

1. Start Excel.
2. Save the new file onto your student drive using Save As: **Function Plot**

## Label Spreadsheet Columns

(Procedure)

3. Select cell A1. Enter the label “x”.
4. Select cell B1. Enter the label f(x).

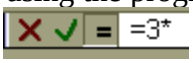
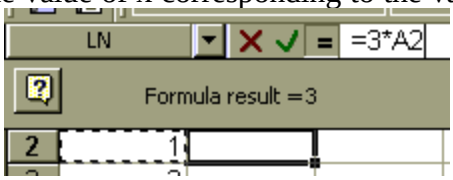
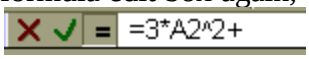
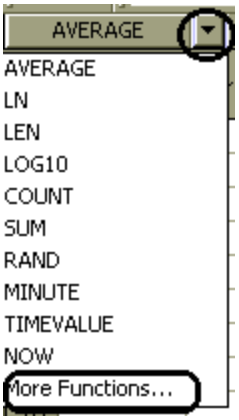
## Enter Values of x for Evaluating Formula

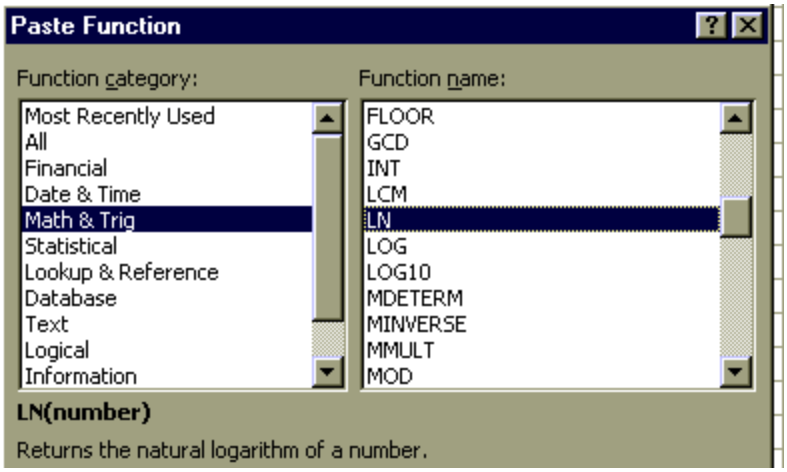
(Procedure)

5. Select cell A2. Enter the number “1”. Press “Enter”.
6. Select cell A3. Enter the number “2”. Press “Enter”.
7. Highlight cells A2 and A3.
8. Use the copy handle in the lower right corner of the range selection to drag the values of x down to cells A4 through A11. The values from A2 through A11 should be “1” through “10”.

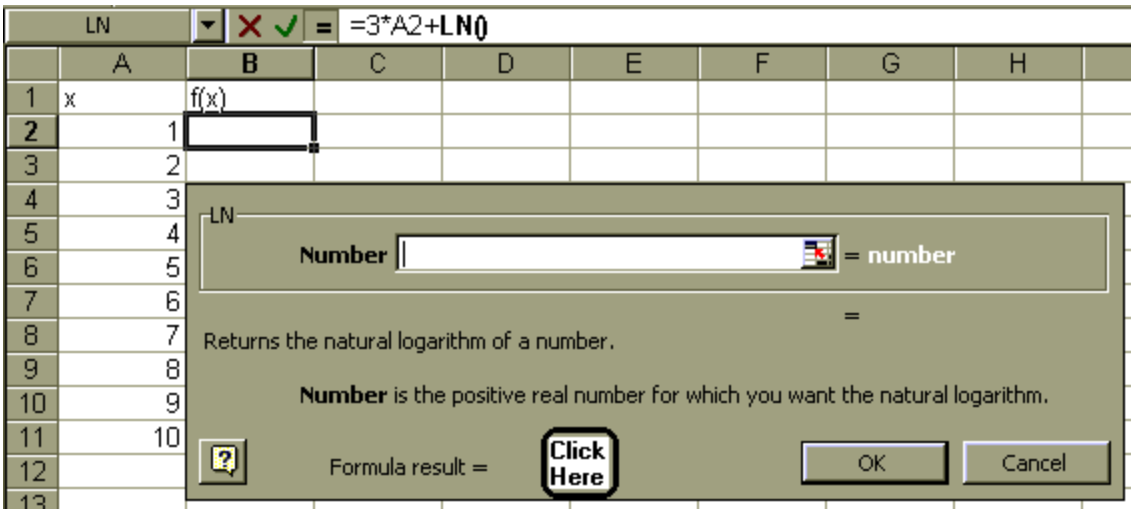
## Enter the Formula to be Plotted

(Procedure)

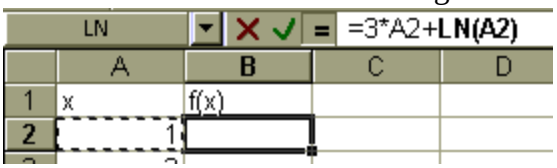
9. Select cell B2.
10. Click in the formula edit box. 
11. Enter the formula using the programming style formula notation.
    a. Enter **3*** 
    b. Click on cell A2, which contains the value of x corresponding to the value of f(x) being entered into cell B2. 
    c. Click in the formula edit box again, clicking to the right of the "A2".
    d. Enter **^2+** 
    e. Click on the down-arrow to the left of the formula edit box to extend the menu of functions. Select "More functions". 
    f. In the "Function category" section of the "Paste Function" dialog box, select "Math & Trig". In the "Function name" section, locate by scrolling and select "LN".



g. Click in a blank gray area of the LN dialog box. Left-drag the box to a new location so that cell A2 is visible.

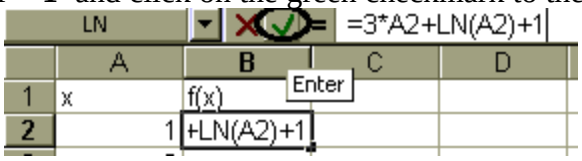



h. Click in cell A2. This enters the cell reference "A2" that contains the value of x for which the formula is being evaluated.

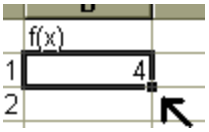



i. Click the "OK" button in the LN dialog box.

j. Click to the right of the expression in the edit box, which moves the insert cursor to the right of "LN(A2)".

k. Enter **+1** and click on the green checkmark to the left of the formula edit box. 

Excel will evaluate the formula and enter the result into cell B2. Cell B2 now contains a formula, and it displays the evaluation of that formula.

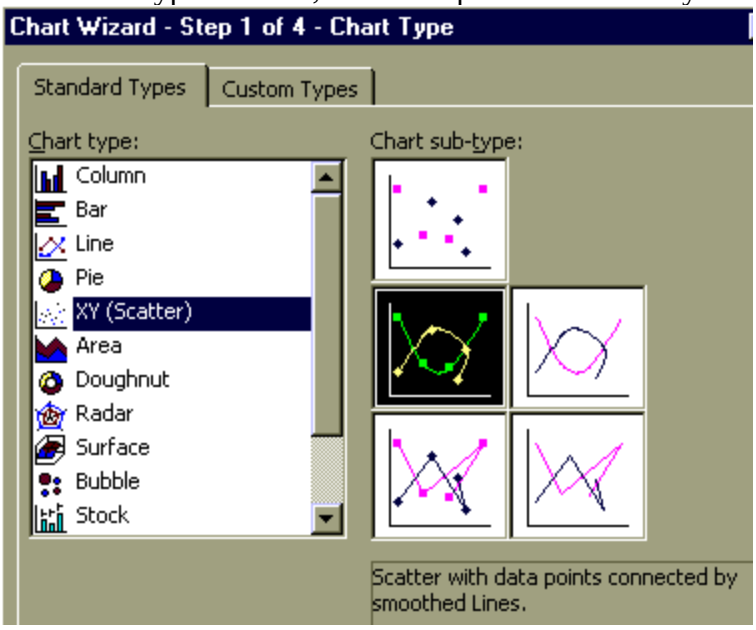


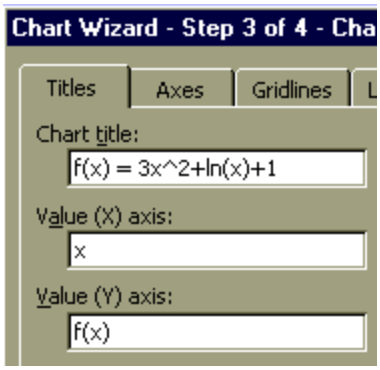

12. Place the mouse cursor on top of the cell copy handle. The mouse cursor will appear as a bold cross when it is positioned correctly.
13. Left-drag the copy-handle to cell B11. This copies the formula into cells B3 through B11, changing the references to x. When the left mouse button is released, Excel will evaluate f(x) and insert the results into cells B3 through B11. If cell B11 contains 33.30259, the procedure has been done correctly.

## Plot the Data

(Procedure) Use the Scatter chart with lines connecting data points to plot the data.

14. Highlight cells A1 through B11.
    a. Click on cell A1.
    b. Push and hold the Shift key.
    c. Click on cell B11.
    d. Release the Shift key.
15. Click on the Excel Chart Wizard icon in the Standard Toolbar. 

16. In the "Chart type" section on the "Standard Types" tab, select the "Scatter" plot.
17. In the "Chart sub-type" section, select the plot with smoothly connected data points. 

18. Click the "Next" button on the Chart Wizard, Step 1 of 4.
19. Click the "Next" button on the Chart Wizard, Step 2 of 4.
20. Chart Wizard, Step 3 of 4: Label the axes as **x** and **f(x)**.
21. On the "Title" sheet, 

    a. Enter the chart title, f(x)=3x^2+ln(x)+1.
    b. Enter "x" as the "Value (X) axis".

   c. Enter “f(x)” as the “Value (Y) axis”.
22. Click the “Next” button on the Chart Wizard, Step 3 of 4.
23. Click the “Finish” button on the Chart Wizard, Step 4 of 4.
24. Adjust the location and size of the chart to reveal the shape of the curve, with the chart on the same sheet as the data.
25. Click on another spreadsheet cell to deselect the chart.
26. Put your name, date, and assignment title “Function Plot” in the spreadsheet header. File | Page Setup | Header/Footer | Custom Header
    a. Enter your name into the left section.
    b. Enter the date into the center section.
    c. Enter the title “Function Plot” into the right section.
27. Print Preview
28. Print