

Function Plot

- Entering Equations
 - Arithmetic operators: () + - * / ^
 - Operator Precedence
 - Functions:
 - Math and Trig
 - LN(), LOG10(), LOG(number, base)
 - LN is LOG Base e. $e \approx 2.71828$
 - Conversions
 - DEGREES() converts radians to degrees
 - 2π radians = 360° , $\pi \approx 3.14159$
 - Trig Functions: SIN(radians), COS(radians), TAN(radians)
 - Inverse Trig Functions: ASIN(), ACOS(), ATAN()
 - The answer is an angle in radians
 - Beware of ambiguity in answer for ATAN()
 - ATAN2(xnum, ynum) will give correct angle, but you must know xnum and ynum.
 - Hyperbolic Trig Functions (used in engineering and physics)
 - SINH(), COSH(), TANH()
 - Inverse Hyperbolic Trig Functions
 - ASINH(), ACOSH(), ATANH()
 - Many more. Play tourist.
 - LEN(): Length of a string of characters, the number of characters in a string.
 - Statistical
 - Location: AVERAGE, MEDIAN, MODE, MIN, MAX
 - Dispersion:
 - STDEV
 - VAR: Sample Variance (divide by $n - 1$)
 - VARP: Population Variance (divide by n)
 - Distributions
 - Statistical Tests
 - Logical: AND, OR, NOT, TRUE, FALSE, IF
- To plot a function, generate values of the function for various combinations of inputs of interest. For the homework exercise, evaluate for values of x from 1 to 10.
- Page | Setup | Header / Footer; enter name, date, and title into the header.

Transformation, Plot, and Regression: Liberty Ship Production

- Download starting file from course web site by going to the Lab Notes page. This is real data from World War II.
- In this course, learn the mechanics of doing the functions, plots, and regression. In your other courses, learn to interpret the results.
- Moving and Scaling Plots
 - Moving: Place mouse cursor in blank area of plot. When you get a four-headed arrow, you left-drag the plot to its new position.
 - Scaling:
 - Corner scaling handles
 - Edge scaling handles
- Regression: Fitting a function (curve or surface) to data
 - Should always do a scatter plot of the raw data first
 - The type of function you use in the regression model depends upon the problem you are doing.

Sorting and Histogram

- Function TEXT | LEN finds the number of characters in a string, such as a word.
- Sorting
 - Select the column you want to sort on. This is the **sort key**.
 - “Expand the Selection”: Identify the columns to be swapped when the key column is swapped.
 - Can sort Ascending or Descending.
 - Header Row: If identified as present, this row will not be swapped when others are swapped.
- Histogram Data Preparation: Tools | Data Analysis | Histogram
 - Counts the number of responses in each bin of values. (Draw example.)

Bin Values	3 to 6	6 to 9	9 to 12	12 to 15
Count	4	7	10	5

- Identify source data
- Define upper bin limits
- Specify location to record count data
- Histogram Chart
 - Select chart via chart wizard.
 - Follow the directions of the wizard.
 - Move chart to desired location and adjust its overall size.