

LAB B: LINES AND PLOTS

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Overview

There are two objectives in this lab:

- review our ability to work with the equations for lines and
- learn to use Maple 9.5 to produce nice plots of functions.

Maple Essentials

- The *Lines* maplet is started from the Maple 9.5 user interface under the **Tools** menu:
 - **Tools** → **Tutors** → **PreCalculus** → **Lines** ...
- The *Plot Builder* maplet is started from the Maple 9.5 user interface under the **Tools** menu:
 - **Tools** → **Assistants** → **Plot Builder** ...

Formulas

- Slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$
- Point-Slope Form: $y - y_1 = m(x - x_1)$
- Slope-Intercept Form: $y = mx + b$

Activities

- (1) Log in and Start a Maple session.
- (2) Find the *slope-intercept* form of the equation of the line passing through the points $(2, 4)$ and $(1, -7)$ in two ways.
 - By Hand:
 - (a) Find the slope m .
 - (b) Use the slope and given points to find the *Point-Slope* form of the line.
 - (c) Solve for y to find *Slope-Intercept* form.
 - Using Maple:
 - (a) Launch the *Lines* maplet.
 - (b) Click the dot that say **Two points** and input the two points.
 - (c) Click **Display**. Notice that the *slope-intercept* form displays exactly the same formula we calculated by hand.
- (3) Find the equation of the line that is parallel to $y = 4x - 2$ and passes through the point $(2, 5)$ using Maple.
- (4) Find the equation of the line that is perpendicular to $x - 4y = 7$ and passes through the point $(3, -4)$ using Maple.
- (5) Launch the *Plot Builder* maplet.

- (6) Create a beautiful graph as follows.
 - (a) Click **add** and type \sqrt{x} then click **accept**.
 - (b) Click **add** and type $|x|$ then click **accept**.
 - (c) Click **add** and type $2 * x$ then click **accept**.
 - (d) Click **done**.
 - (e) Change the x bounds at the bottom right so it reads -5 to 5 .
 - (f) Click **options**.
 - (g) Give your graph a title.
 - (h) For each of the three functions, select the function at the top and experiment with changing the **Color** and **Line** used on each function. Remember, changing the **Color** distinguishes the graphs on the screen and on color printers, but you will need to change the **Line** if you use a black and white printer like those on campus.
 - (i) When you are ready to see the graph, click **Plot**.
 - (j) Now that your Maple worksheet contains a plot, position the cursor over the plot and press the right mouse button to see the context menu. Under the option **Legend**, select **Show Legend**. Now, from the same context menu, select **Edit Legend**. Enter an appropriate label for each of the three functions.
- (7) Transfer your completed graph to a Word document as follows.
 - (a) Position the cursor over the plot and press the right mouse button to see the context menu. Select **Copy**.
 - (b) Open **Microsoft Word** from the **Start** menu at the bottom left of the screen. On the blank document, press the right mouse button to see the context menu. Select **Paste**.
- (8) Remember that every figure in your projects should have a title and a legend and should accurately distinguish the functions.
- (9) Remember to logout.

Assignment

Your assignment for this week is to complete this lab if you did not have the opportunity in your lab period. This material will be included on Maple Quiz 1.