

# Lines and Plots

Douglas B. Meade and Robert F. Murphy  
Department of Mathematics

## Overview

There are two objectives in this lab: to review our ability to work with the equations for lines and to learn to use Maple 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 *FunctionPlotter* maplet is available from USC at the URL:

<http://www.math.sc.edu/~meade/141L-F04/maplets/CalcUSC/FunctionPlotter.maplet>

- The *Plot Builder* maplet is started from the Maple 9.5 user interface under the **Tools** menu:

**Tools** → **Assistants** → **Plot Builder ...**

## Preparation

To review properties of lines, read pages 51 – 53 in §1.5 and pages A20 – A25 in Appendix C of Anton. To help determine an appropriate viewing window before graphing, read Examples 3 – 5 (pages 31 – 33) in §1.3 of Anton.

## Activities

- Start a Maple session.
- Launch the *Lines* maplet. *This interface allows you to enter a line in one of several forms — point-slope, two-point, slope-intercept, or general — and to see the equation in the other forms.*
  - Work Exercises #18, 20, and 22 (page 60) in §1.5 of Anton.
- Launch the *FunctionPlotter* maplet. *This is a nice intuitive interface for creating simple plots.*
  - Work Exercises #2, 5, and 14 (pages 36 – 37) in §1.3 of Anton.
- Launch the *Plot Builder* maplet. *This approach has more features than the previous maplet, displays the plot in the Maple worksheet, and produces plots that may be copied to other applications, e.g., a Word document.*
  - Generate a single plot with graphs of  $y = x^2 - 4$ ,  $y = 4 - x^2$ , and  $y = |x^2 - 4|$  for  $-5 \leq x \leq 5$ . (Select **Add** to enter each expression, **Done** to choose a 2-D plot, then **Plot**).
  - Generate the same plot as before, but before selecting **Plot**, select **Options**. (Once you select **Plot** you cannot return to the **Options** window.) First, give your plot a *title*. For each of the three functions, select the function at the top left of the **PlotBuilder** window and change some of its features. The options under **Color** distinguish curves well on the computer screen and on color printers. The options under **Line** are more effective at distinguishing curves printed on a black-and-white printer. When you are ready to see the graph, click **Plot**.
  - 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 the first curve. Repeat this step for the other curves in the plot.
  - For some Maple projects it will be useful to copy your final plot to a Word document. If you have time, see if you are able to do this now.
- If you are using a computer in a SAM lab, remember to logout.

## Assignment

There is no assignment to be turned in this week. This material will be included on Maple Quiz 1.