Functions and Expressions

Introduction

The purpose of this lab is to work with function and expression commands in Maple. Use the commands from last week's lab and the reference sheet to complete the exercise.

Exercises

- 1. A Enter $y = \sin(5x)$ and the horizontal line $y = \frac{1}{2}$ as expressions or as functions. Your choice. Plot the two on the same graph over the domain $-2\pi \le 2\pi$.
 - B Copy and paste the commands you entered and change the coefficient of x so you have $y = \sin(4x)$ and $y = \frac{1}{2}$ and their plot.
 - C Repeat the process so you have $y = \sin(3x)$ and $y = \frac{1}{2}$ and their plot.
 - D Repeat the process so you have $y = \sin(2x)$ and $y = \frac{1}{2}$ and their plot.
 - E Repeat the process so you have $y = \sin(1x)$ and $y = \frac{1}{2}$ and their plot.
 - F Now answer the questions: How many times does the horizontal line cross the sine function in the given domain? Is there a pattern?
- 2. Enter $y = \frac{5}{2}x^6 + 37x^5 189x^4 2259x^3 \frac{383}{2}x^2 2296x$ as an expression.
 - A Use the factor command to factor the expression. Looking at the output, how many times should the expression cross the x-axis?
 - B Plot the expression. Experiment with the domain and range values until you get a good picture that shows the expression crossing the axis. You may also want to use the option, <code>,thickness=3</code> in your plot command.
- 3. Define $x^2 + 3x 6$ and $-x^2 + 9x + 14$ as functions. Plot them both on the same graph. Estimate the two intersection points by observing the plot. Plug each x value back into both functions to show that the y-values are the same. State what the intersection points are.