First MAPLE Assignment, due Sept. 17
Math 113, Fall 2009

Please turn in a paper copy of your worksheet. An example for the plot command is > plot(sin(x),x=0..2); for plotting $y = sinx$ over the interval from 0 to 2.

1. We want to support the statement that

$$\lim_{x\to 0} \frac{sinx}{x} = 1.$$

For each of the following values of ε, use a plot in Maple to find a positive number δ so that $0 < |x| < \delta$ implies $|\frac{sinx}{x} - 1| < \varepsilon$.

(a) $\varepsilon = .1$

(b) $\varepsilon = .001$

(c) $\varepsilon = .00001$.

2. There is some controversy about how to define 0^0. Some people say it should be 0, "because 0 to any power is 0." Some people say it should be 1, "because any number to the 0th power is 1." We want to support the statement that

$$\lim_{x\to 0^+} x^x = 1.$$

(a) Use a plot in Maple to find a positive number δ so that $0 < x < \delta$ implies $|x^x - 1| < .0001$.

(b) Why can't we look at the limit as x approaches 0 from the left?

3. We want to support the statement

$$\lim_{x\to\infty} \frac{5x-6}{3x+7} = \frac{5}{3}.$$

Use a plot in Maple to find a positive number M so that $x > M$ implies $|\frac{5x-6}{3x+7} - \frac{5}{3}| < .001$.

4. We want to support the statement

$$\lim_{x\to 0} \frac{1}{x^4} = \infty.$$

Use a plot in Maple to find a positive number δ so that $0 < |x| < \delta$ implies $\frac{1}{x^4} > 100000000$.