```
restart;

# Remember click on the symbol [> to get a Maple prompt.
# Then press <F5> to turn the color of your typing red
# so people can the exact letters you typed.  If anyone
# has figured out how to set this as the default please
# let me and the rest of the class know how.

################  PART 1  plotting functions  ################
#
# We have already plotted functions in class.  Here are some
# more examples.
#

#Load the plot subroutine library

with(plots);

#Make a plot of a function

f:=sin(2*x);
plot(f,x=-Pi..Pi);

#Make plot a graph of a different function

g:=sin(3*x);
plot(g,x=-Pi..Pi);

#Put the plots one on top of each other

plot([f,g],x=-Pi..Pi);

#Draw a circle using sin and cos

plot([cos(theta),sin(theta),theta=-Pi..Pi]);

#Parametric plot of a hyperbola

plot([cosh(t),sinh(t),t=-1..1]);

################  PART 2  surfaces  ########################
#
# Given a function one can make a surface by rotating the
# graph around the x-axis.  For some reason Maple draws
# the x-axis vertically by default.  The result looks like
# what would happen if a clay pot were made on a potter's
# wheel with the sides determined by the function.
#

#A function and what the function looks like

f:=(2+z)/(z^2+1);
plot(f,z=-2..2);

#The cylindrical surface specified by the function

plot3d(f,theta=0..2*Pi,z=-2..2,coords=cylindrical);

#Another example

f:=3+sin(z);
plot(f,z=0..3*Pi);
plot3d(f,theta=0..2*Pi,z=0..3*Pi,coords=cylindrical);
```

```
#Try to make something complicated

f:=4+arctan(z+sin(5*z));
plot(f,z=-Pi..Pi);
plot3d(f,theta=0..2*Pi,z=-Pi..Pi,coords=cylindrical);

#Need more accurate plot use numpoints=2000

plot3d(f,theta=0..2*Pi,z=-Pi..Pi,coords=cylindrical,numpoints=2000);

################## PART 3  limits  ###########################
#
# Maple can work a number of limits.  Here are some examples
# from last semester and also some new examples.
#

limit(x/3,x=2);
limit((x^2-1)/(x-1),x=1);
limit((sin(x+h)-sin(x))/h,h=0);
limit(2^(1/n),n=infinity);
limit(n*(1-2^(1/n)),n=infinity);
limit(n*(p^(1/n)-1),n=infinity);
limit((1+2/n)^n,n=infinity);
limit((1+2/n^2)^n,n=infinity);
limit(sin(3*h)/h,h=0);
limit((cos(x)-cos(3*x))/x^2,x=0);
limit(sqrt(n^2+n)-n,n=infinity);
limit(sqrt(n+15)-sqrt(n),n=infinity);
limit(arctan(n),n=infinity);
limit(n*(Pi/2-arctan(n)),n=infinity);
limit(1/x,x=0);
limit(1/x,x=0,left);
limit(1/x,x=0,right);
limit((n^2+n+1)/(3*n^2+17),n=infinity);
```