**EXERCISE 1:** Practice with loops and logical indexing. Assume x1=[1 8 -7 2 -9 -3] to help you test your answers.

**a) Write the following without loops:**

for i=1:length(x1)

if x1(i)>0

x2(i)=1;

else

x2(i)=0;

end;

end;

**b) Write the following using a loop**

x2=x1(1:end-1)>x1(2:end);

**c) What is in x2 after executing this piece of code? Use** x1=[1 8 -7 2 -9 -3]

x2=x1(x1(1:end-1)>x1(2:end))

**d) Write the following using a loop**

ix=find(x1(1:end-1)>x1(2:end))

x2=x1(ix);

**EXERCISE 2:** The points on a circle, radius R, centered at an x,y position (xC, yC) are given by their x,y positions.

x = xC + R cos

y = yC + R sin

between the x-axis and the line from the center of the circle to any given point on the circle. i.e., goes from 0 to 2

Write a function called getcirc that will take as input the variables xc, yc, R and the number of points on the circle (N) in that order and return a vector x and a vector y in that order containing the x and y coordinates of the N points on the circle.

Add a subfunction called checkRN that checks that the radius R is positive and that the number of points is at least 20 (for a reasonably smooth circle).

**EXERCISE 3.** The following script is supposed to call the function getcirc to calculate a circle that has radius 15, is centered at (,1) and then plot the resulting circle. You can assume the subfunction checkRN has been correctly implemented inside getcirc. What are the bugs in this script?

% test script to call getcirc

close all;

clear all;

N=15;

Rp=100;

xc=1;

yc=pi;

[yp,xp]=getcirc(xc,yc,R,N);

figure(1), set(gca, 'FontSize',18);

plot(xp,xp,'k-');

xlabel('X (km)');

ylabel('Y (km)');

title('Testing my circle function');

axis('equal');

**EXERCISE 4.** Add some code to your debugged version of the script above that will write the (x,y) coordinates of the points on the circle to a file called mycirc.dat. Write out the x,y positions as 2 columns (col 1 = x positions, col 2 = y positions). Add a header line that contains the numerical values for (xc,yc), R and N. Format any real numbers so that e.g. the number 101.254 is written in the form 1.013e+02.