**Using Functions \*\* Save all your programs \*\***

1. a) Write a function called circumference(r)that returns the circumference of a circle given the radius.

b) Write a function called area(r)that returns the area of a circle.

c) Write a function called get\_radius() that asks the user for the radius of a  
 circle. This function should also perform two error checks, looping until the user enters valid input. The first error check is ensuring that the user enters a floating point number and the second is to ensure that the number entered is greater than 0. The radius should be returned to the main program.

d) Write a main program for the following algorithm:

Code required for looping of program

while yes:

Input

Process

Output

get radius of circle and validate input

determine area

determine circumference

print results

check if user wants to run program again

yes – continue looping

no – break

2. a) There is a concept in mathematics called "factorial", which is the product of all positive integers from the selected number down to 1.  This operation is denoted in mathematics with the exclamation point (!).

For example, 5! = 5 x 4 x 3 x 2 x 1 = 120

Create a function called factorial(n) that returns the factorial of a number.

b) Add a function called get\_n() that asks the user for the value of n. This function should also perform two error checks, looping until the user enters valid input. The first error check is ensuring that the user enters an integer and the second is to ensure that the number entered is greater than 0. The value of n should be returned to the main program.

c) Write a main program with the following features, as in the first program:

* + Loops until the user indicates that they are done
  + Gets and validates user input
  + Calculates the factorial
  + Outputs the results

3. a) Create a boolean function called is\_even(num) that will return True if num is even and otherwise it will return False.

b) Write a main program that asks the user how many numbers they would like to test. The program should then randomly generate that many numbers and for each number, check and output to the user if that number was either even or odd. When done testing all the numbers, the program should end and report the total number of evens and odds to the user.

c) Add the following enhancements:

* + Write a function that gets and validates user input
  + Loop the program