Midterm #1 – Additional Sample Questions

1. Write a program that calculates and prints out the distance between these two points: **(2, 5)** and **(9, 5)**. Use the distance formula below in conjunction with **hard-coded numbers** for both x values and both y values.

   The distance formula is: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

   ```python
   import math
   d = math.sqrt((9 - 2) ** 2 + (5 - 5) ** 2)
   print(d)
   ```

2. What is the output of the following code?

   ```
   a) print(5 ** 3)
   ```
   a) _____125_____

   ```
   b) n = 5
      n -= 2
      print(n)
   ```
   b) _____3_____

   ```
   c) s = '%s created Python in %s'
      print(s % ('Guido van Rossum', 1991))
   ```
   c) _Guido van Rossum created Python in 1991_

   ```
   d) print(17 // -10)
   ```
   d) _____-2_____

3. Write a program that **asks the user for a number**. The program will take the number and **print out all factors of that number**. Use the algorithm below.

   a) **Check every possible factor** of that number by counting from **one** up to and **including the number entered**.

   b) If the original number entered is divisible by the factor (that is, if the remainder is 0), consider it a valid factor and print it.

   Example Output:
   ```
   Please enter a number
   > 21
   1
   3
   7
   21
   ```

   ```python
   num = int(input('Please enter a number\n> '))
       for potential_factor in range(1, num + 1):
           if num % potential_factor == 0:
               print(potential_factor)
   ```

4. Write two ways to count down from 10 to 0 by 2's: once using a while loop, another time using a for loop.

   ```python
   for i in range(10, -1, -2):
       print(i)

   count = 10
   while count >= 0:
       print(count)
       count -= 2
   ```

5. Describe the following *escape sequences*:

"\\"   _____backslash character (\)_____

"\n"   _____new line character_____

"\""   _____double quote (")_____

6. Write a program that **continually asks for numbers until the user enters three consecutive numbers that are all the same**. Once three consecutive numbers that are equal are entered, the program will **print out 'Done!'**. Assume that the user only enters numbers.

   Hints:
   a) you will have to keep track of a previous value (but how will you initialize it?)
   b) 3 consecutive numbers means that the 1st in the series wasn't equal to a previous, but the next two are

   Example Output:
   ```
   Please enter a number
   > 5
   Please enter a number
   > 5
   Please enter a number
   > 7
   Please enter a number
   > 7
   Please enter a number
   > 7
   Done!
   ```

   ```
   consecutive = 0
   prev = ''
   while consecutive < 2:
       num = int(input('Please enter a number\n> '))
       if prev == num:
           consecutive += 1
       else:
           consecutive = 0
       prev = num
   ```

7. **Write a function called total_yearly_salary** that calculates and displays the total yearly salary when given a monthly salary and a bonus. **It should take two parameters**:

   a) monthly salary
   b) yearly bonus

   To calculate the total yearly salary, multiply the monthly salary by 12, and add the yearly bonus. For example, if the first parameter were 5000, and the second parameter were 2000, then the function would print out:

   ```
   The total yearly salary is: 62000
   ```

   In the space below, **define the function and call it** with the arguments 5000 for monthly salary and 2000 for bonus. (3 points)

   ```
   def total_yearly_salary(monthly, bonus):
       print('The total yearly salary is %s' % (monthly * 12 + bonus))

   total_yearly_salary(5000, 2000)
   ```