CS 10 Lab 1 (Lesson 1 to 10)
(5 points)

1. Follow the Lab instructions and video on how to submit labs.
2. You do not need to submit questions 1 to 3
3. Submit questions 4 to 8 only. Must number your questions from 4 to 8.
4. For each question you must provide output for 3 test runs (use the sample test run data already provided plus makeup 2 more yourself). Except for number 8 where one test run is needed. For each question that do not have 3 test runs a zero will be given even if the program runs correctly.
5. Follow the steps in the Lab instructions to separate each question with question number, short description of the question.
6. If the program does not run a zero will be given
7. If the program runs but does not fulfill all the specifications stated in the question, a zero score will be given. Your test run must be exactly the same as the sample test run provided.
8. Use only topics covered in Lesson 1 to Lesson 10. Using topics or tools not in Lesson 1 to Lesson 10 will result in a zero for that question. No if, loops, functions, list.

Notes:

Syntax errors – spelling and indentation mistakes, wrong use of commands or functions, program does not run. Python displays errors

Runtime errors – the program executes and runs but stops because of errors incurred.

Logic errors – program runs but the logic is incorrect, for example calculation errors due to wrong mathematical equation use.

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1. Use the internet to find out what is the order of precedence for Python numeric operators.(do not submit)

2. What are the results of the following expressions? Use hand calculations with calculator. After you are done writing the answer. Start Python IDLE in the shell window type the expression into the shell and check answers.(do not submit)
   Expression Result

Expression	Result
42 / 5	_____
42 // 5	_____
42 % 5	_____
40 % 5	_____
1 % 2	_____
2 % 1	_____
45 + 4 * 4 – 2	_____
45 + 43 % 5 * (23 * 3 % 2)	_____
5 ** 2	_____
5.1 ** 2	_____

   ** When a floating-point number is too small (that is, too close to zero), it causes *underflow* and Python approximates it to zero.

3. Write the following expression in Python. Test your expression using python shell.

$$\frac{4}{3(r + 34)} - 9(a + bc) + \frac{3 + d(2 + a)}{a + bd}$$

4. Write a program that reads in the radius and length of a cylinder and computes the area and the volume using the following formulas (use PI = 3.141):

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area = radius X radius X π
volume = area X length
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Here is a sample run(blue user input):

Test run 1
Enter the radius of a cylinder: 5.5
Enter the length of a cylinder: 12
The area is 95.01525
The volume is 1140.183

Test run 2 and 3(provide your own input data)

5. A company has determined that its annual profit is about 24 percent of total sales. Write a program that asks the user to enter the projected amount of total sales, then displays the profit that will be made from that amount.
(hint: Use the value .24 to represent 24% profit margin)
Formula for profit = projected total sales X profit margin

Here is a sample run(blue user input):

Test run 1
Enter the projected total sales : 1250.00
The profit made from this amount : 300.00

Test run 2 and 3(provide your own input data)

6. A cookie recipe calls for these ingredients

- 1.5 cups of sugar
- 1 cup of butter
- 2.75 cups of flour

The recipe produces 48 cookies with this amount of the ingredients. Write a program that asks the user how many cookies he or she wants to make, then displays the number of cups of each ingredient needed for the specified number of cookies. See input/output below.(hint : constants)

Here is a sample run(blue user input):

Test run 1
Enter the number of cookies: 56

To make 56.0 cookies, you will need: #this is the output, run program 4 more times with
1.75 cups of sugar   #different number of cookies as test cases
1.17 cups of butter
3.21 cups of flour

Test run 2 and 3(provide your own input data)

7. Write a program that prompts the user to enter a four-digit integer and displays the number in reverse order. (hint: use math operators, using loops or list will result in a zero score)

Here is a sample run(blue user input):

Test run 1
Enter an integer: 3125
5
2
1
3

Test run 2 and 3(provide your own input data)

8. The radius and mass of the Earth are r = 6378 X 10^3 meters and $m1$ = 5.9742 X 10^{24} kg, respectively. Mr. Jones has a mass of m kg. Prompt the user to input m and then calculate the gravitational force (F) and acceleration due to gravity (g) caused by gravitational force exerted on him by the Earth.

The formula:

$g = [G(m1)(m)/(r^2)]/m$

Let the universal gravitational constant G = 6.67300 X 10^{-11} (in units of $m^3kg^{-1}s^{-2}$ assuming the MKS meter-kilogram-second] system). Check that the resulting value of g is close 9.8 m/s². The ? are decimal places-you should format to 4 decimal places.

Here is a sample run(blue user input):

Test run 1(only one test run required)
Enter a mass in kg: 30

The resulting value of g is 9.8??? which is close to the earth's gravitational force.

--the ??? marks indicates the next 3 digits after 9.8. You will need to format the output.