Python Exercise 1

Slope of a line (15 points)

Write a program that prompts the user to enter the coordinates of two points (x_1, y_1) and (x_2, y_2). The program should calculate and display the slope of the line that connects the two points.

The formula for the slope is $\frac{y_2-y_1}{x_2-x_1}$.

Format your output to five decimal places.

Sample output:

Enter the x-coordinate for point1: 4.5
Enter the y-coordinate for point1: -5.5
Enter the x-coordinate for point2: 6.6
Enter the y-coordinate for point2: -6.5
The slope for the line that connects two points (4.5 , -5.5) and (6.6 , -6.5) is -0.47619

Runway Length (15 points)

Given an airplane's acceleration, a, and take-off speed, v, the minimum runway length needed for the airplane to take off is computed using the formula $\frac{v^2}{2a}$.

Write a program that prompts the user to enter the speed in meters per second (m/s) and the acceleration in meters per second squared (m/s^2). The program should calculate and display the minimum runway length. Format the result to four decimal places. (For this question, assume that all values entered are positive.)

Sample output:

Enter the plane's take off speed in m/s: 60
Enter the plane's acceleration in m/s**2: 3.5
The minimum runway length needed for this airplane is 514.2857 meters.

Tip Calculator (15 points)

Write a program that reads the subtotal and gratuity rate. The program then calculates and gratuity as a dollar amount, followed by the total amount, and displays all information in dollars.

Your code should include currency formatting (i.e., use the $ in your output, include comma separation and format the result to 2 decimal places.)

Sample output:

Enter the subtotal: $1250
Enter tip amount (as a %): 25
Subtotal: $ 1,250.00
Tip: $ 312.50
Total: $ 1,562.50

Area of a Hexagon (15 points)

Write a program that prompts the user to enter the side of a hexagon and displays its area. The area of a hexagon is $\frac{3\sqrt{3}}{2}s^2$. Assume that the side entered is positive.

Format the result to three decimal places. Use the functions pow and sqrt from the math module to express the formula accurately. (See section 2.9 in your zyBook to review the math module.)

Sample output:

Enter the side length of the hexagon: 5.5
The area of a hexagon with side length 5.5 is 78.592