Question #1: Expression

Objective: Expression

Write a python program to calculate the projection motion as details below.

1. Inputs:
   - v_0: The initial velocity of the projectile (in m/s).
   - θ: The launch angle (in degrees).
2. Conversion:
   - The angle is converted from degrees to radians using math.radians() since trigonometric functions in Python work with radians.
3. Equations, where g = 9.81 m/s^2:
   - Maximum Height (h_{max}) in meters:

$$h_{max} = \frac{v_0^2 \cdot \sin^2(\theta)}{2g}$$

   - Maximum Range (R) in meters:

$$R = \frac{v_0^2 \cdot \sin(2\theta)}{g}$$

   - The time-of-flight T is calculated using the formula in seconds:

$$T = \frac{2v_0 \sin(\theta)}{g}$$

4. Outputs:
   - The maximum height, maximum range, and the time of flights.

INPUT

A single line containing (1) the initial velocity of the projectile (m/s) and (2) the launch angle (in degrees). If the number of inputs is not equal to 2, show an error message “Error!”.

OUTPUT

A single line containing (1) the maximum height, (2) maximum range, and (3) the time of flights. They must be shown in two decimal points (e.g., 7.00); Hint: f-string (f“...”) should be helpful. Moreover, all outputs must not be negative.

EXAMPLES

Input (from keyboard)	Output (on-screen)
	Error!
1.2	Error!
12 77.5	7.00 6.20 2.39
7.5 75.5	2.69 2.78 1.48
20 190.75	0.71 14.94 0.76
7.5 90 100	Error!

Test Cases in Grader

Testcases will be grouped. Each group has the following criteria:

Testcases quantity	Testcase characteristics
14%	Error inputs
57%	Valid inputs and positive outputs
29%	Valid inputs and negative outputs