LAB 1

1→ def calculate_operations():

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    print("Enter two numbers:")

    # Taking inputs from the user
    num1 = float(input("Enter the first number: "))
    num2 = float(input("Enter the second number: "))

    # Calculating operations
    sum_result = num1 + num2
    difference = num1 - num2
    product = num1 * num2
    if num2 != 0:
        integer_quotient = num1 // num2
        remainder = num1 % num2
        fractional_quotient = num1 / num2
    else:
        integer_quotient = "Undefined (division by zero)"
        remainder = "Undefined (division by zero)"
        fractional_quotient = "Undefined (division by zero)"

    # Displaying results
    print("\nResults:")
    print(f"Input Numbers: {num1} and {num2}")
    print(f"Sum: {sum_result}")
    print(f"Difference: {difference}")
    print(f"Product: {product}")
    print(f"Integer Quotient: {integer_quotient}")
    print(f"Remainder: {remainder}")
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    print(f"Fractional Quotient: {fractional_quotient}")

# Call the function
calculate_operations()
```

2→

```
import math

def triangle_calculations():
    print("Enter the three sides of the triangle:")

    # Taking inputs for the three sides
    a = float(input("Enter side a: "))
    b = float(input("Enter side b: "))
    c = float(input("Enter side c: "))

    # Check if the inputs form a valid triangle
    if a + b > c and a + c > b and b + c > a:
        # Calculate the perimeter
        perimeter = a + b + c

        # Calculate the semi-perimeter
        s = perimeter / 2

        # Calculate the area using Heron's formula
        area = math.sqrt(s * (s - a) * (s - b) * (s - c))

        # Calculate the angles using the cosine rule
        angle_A = math.degrees(math.acos((b**2 + c**2 - a**2) / (2 * b * c)))
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        angle_B = math.degrees(math.acos((a**2 + c**2 - b**2) / (2 * a * c)))
        angle_C = math.degrees(math.acos((a**2 + b**2 - c**2) / (2 * a * b)))

        # Displaying the results
        print("\nResults:")
        print(f"Sides of the triangle: a = {a}, b = {b}, c = {c}")
        print(f"Perimeter: {perimeter}")
        print(f"Area: {area:.2f}")
        print(f"Angles: A = {angle_A:.2f}°, B = {angle_B:.2f}°, C = {angle_C:.2f}°")
    else:
        print("The entered sides do not form a valid triangle.")

# Call the function
triangle_calculations()
```

3.

```
def calculate_parallel_impedance():
    print("Enter the two impedances in the form of real and imaginary parts:")

    # Taking inputs for Z1 and Z2
    real1 = float(input("Enter the real part of Z1: "))
    imag1 = float(input("Enter the imaginary part of Z1: "))
    Z1 = complex(real1, imag1)

    real2 = float(input("Enter the real part of Z2: "))
    imag2 = float(input("Enter the imaginary part of Z2: "))
    Z2 = complex(real2, imag2)

    # Calculating the equivalent impedance for parallel connection
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    if Z1 != 0 and Z2 != 0:
        Z_eq = (Z1 * Z2) / (Z1 + Z2)
    else:
        Z_eq = complex(float('inf'))  # Infinite impedance if either is 0

    # Displaying the results
    print("\nResults:")
    print(f"Z1 = {Z1}")
    print(f"Z2 = {Z2}")
    print(f"Equivalent Impedance (Zeq): {Z_eq}")
    print(f"Real part of Zeq: {Z_eq.real}")
    print(f"Imaginary part of Zeq: {Z_eq.imag}")

# Call the function
calculate_parallel_impedance()
```