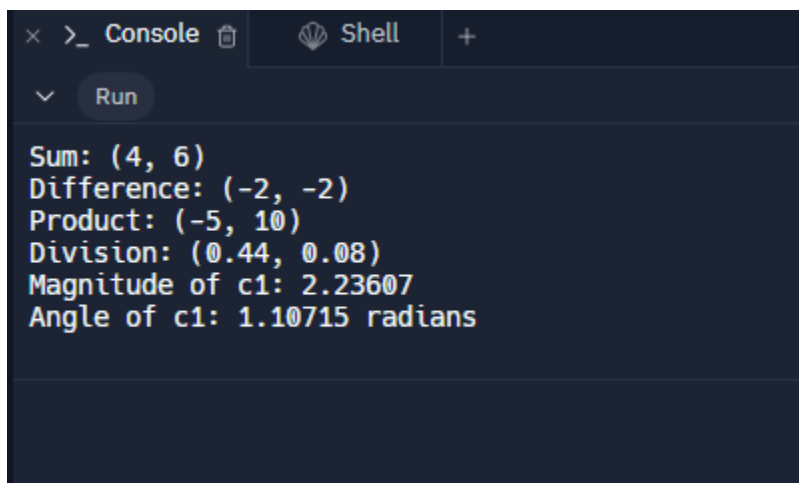


1. This program design is to calculate complex number. Complex values are denoted by a parenthesized pair of values separated by a comma representing the real and imaginary part of the variable. For example, $(1, 2)$ indicates that the real part is 1 and the imaginary part is 2. A complex number can also be represented by the magnitude and angle format like this $(1 \angle 45)$ indicating a complex value with a magnitude of 1 and an angle of 45 degrees

You will need to implement the *Complex* class, and provide operations for the **plus**, **minus**, **multiply**, and **divide** calculations. You will **NOT** need an exponentiation operator for this assignment. The *Complex* class will need a constructor with no arguments (default constructor), one with two arguments with initial values of both the real and imaginary part, and a third constructor that builds a complex number from a *const string&*, such as *Complex("123, 456")*. You will likely need the *length()* and *empty()* methods that give the length of a string and a Boolean *true* value if the string is empty. You will also need a member function to calculate the magnitude of the complex value, the angle of the value, and the complex conjugate of the value. Finally, you will create a *Print()* method in your *Complex* class to print the value of the complex number.

Here is the output, the code is in the replit link and also in cpp file



```
× > Console Shell +
Run
Sum: (4, 6)
Difference: (-2, -2)
Product: (-5, 10)
Division: (0.44, 0.08)
Magnitude of c1: 2.23607
Angle of c1: 1.10715 radians
```

2. Design a program to implement matrix operations, such as **add**, **subtract** and **multiply** (we won't do divide). In order to do this, we will create a class called *Matrix* that processes a two-dimensional matrix. This class contains a constructor that builds the matrix with data from a character string. To describe a matrix with a string, we use parenthesis to delineate the rows of the matrix. For example: $(1,2,3),(4,5,6),(7,8,9)$ would represent the matrix: $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$

Here is the output, the code is in the replit link and cpp file too

```
Matrix A:
(10 11 16)
(18 14 13)
(12 17 19)

Matrix B:
(23 31 19)
(21 13 34)
(37 23 17)

Matrix C:
(14 28 32)
(48 50)
(22 57 1)

Matrix D:
(54 21 36)
(61 69 1)
(37 21)

Performing calculations for Matrix A and Matrix B:

Matrix Addition Result (A + B):
()
(33 42 35)
(39 27 47)
(49 40 36)

Matrix Subtraction Result (A - B):
()
(-13 -20 -3)
(-3 1 -21)
(-25 -6 2)

Matrix Multiplication Result (A * B):
()
(1053 821 836)
(1189 1039 1039)
(1336 1030 1129)

Matrix C and Matrix D are invalid (Not a Matrix).
```

