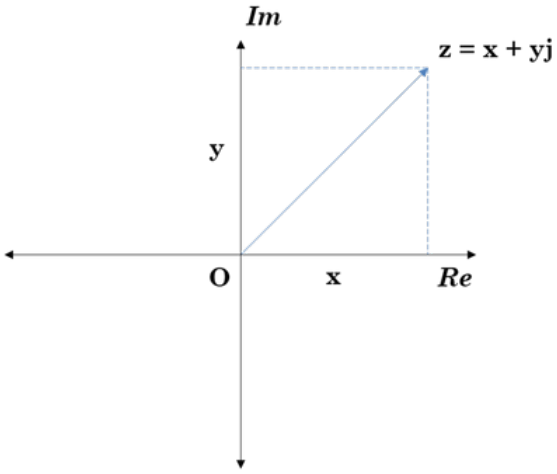
# Polar Coordinates

**Polar coordinates** are an alternative way of representing Cartesian coordinates or Complex Numbers.

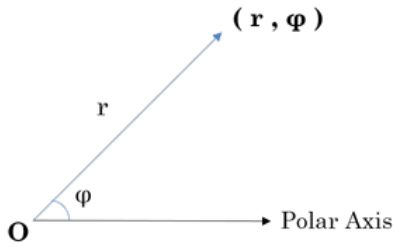
A complex number $z$




$$z = x + yj$$

is completely determined by its real part $x$ and imaginary part $y$.
Here, $j$ is the imaginary unit.

A polar coordinate $(r, \varphi)$




is completely determined by modulus $r$ and phase angle $\varphi$.

If we convert complex number $z$ to its polar coordinate, we find:
$r$: Distance from $z$ to origin, i.e., $\sqrt{x^2 + y^2}$
$\varphi$: Counter clockwise angle measured from the positive $x$-axis to the line segment that joins $z$ to the origin.

Python's cmath module provides access to the mathematical functions for complex numbers.

### *cmath.phase*

This tool returns the phase of complex number $z$ (also known as the argument of $z$).

```
>>> phase(complex(-1.0, 0.0))
3.1415926535897931
```

### *abs*

This tool returns the modulus (absolute value) of complex number $z$.

```
>>> abs(complex(-1.0, 0.0))
1.0
```

**Task**

You are given a complex $z$. Your task is to convert it to polar coordinates.

### Input Format

A single line containing the complex number $z$. Note: complex() function can be used in python to convert the input as a complex number.

### Constraints

Given number is a valid complex number

### Output Format

Output two lines:
The first line should contain the value of $r$.
The second line should contain the value of $\varphi$.

### Sample Input

```
1+2j
```

### Sample Output

```
2.23606797749979
1.1071487177940904
```

**Note: The output should be correct up to 3 decimal places.**