Real and Imaginary Parts of a Complex Number.

If x and y are two real numbers, then a number of the form $z = x + iy$ is called a complex number. Here 'x' is called the real part of z and 'y' is known as the imaginary part of z. The real part of z is denoted by Re(z) and the imaginary part by Im(z).

If $z = 3 - 4i$, then Re(z) = 3 and Im(z) = -4.

Note: A complex number z is purely real if its imaginary part is zero i.e., Im(z) = 0 and purely imaginary if its real part is zero i.e., Re(z) = 0.

i can be denoted by the ordered pair (0,1).

The complex number (a, b) can also be split as (a, 0) + (0, 1) (b, 0).

Important Tips

☞ A complex number is an imaginary number if and only if its imaginary part is non-zero. Here real part may or may not be zero.

☞ All purely imaginary numbers except zero are imaginary numbers but an imaginary number may or not be purely imaginary.

☞ A real number can be written as a + i.0, therefore every real number can be considered as a complex number whose imaginary part is zero. Thus the set of real number (R) is a proper subset of the complex number (C) i.e., $R \subset C$.

☞ Complex number as an ordered pair : A complex number may also be defined as an ordered pair of real numbers and may be denoted by the symbol (a,b). For a complex number to be uniquely specified, we need two real numbers in particular order.