Remarks :-

1- The element i is defined as $i = (0,1)$

2. $i^2 = -1$.

proof $i^2 = i \cdot i = (0,1)\cdot(0,1) = (0\cdot 0 - 1\cdot 1, 0\cdot 1 + 0\cdot 1)$

$= (-1, 0) = -1$

3- $(a,b) = a + ib$.

Proof :- $a + ib = (a,0) + (0,1)\cdot(b,0)$

$= (a,0) + (b\cdot 0 - 1\cdot 0, 0\cdot 0 + 1\cdot b)$

$= (a,0) + (0,b)$

$= (a+0, b+0) = (a,b)$.

4. The conjugate of complex number مرافق العدد المعقد

Let $z = a + ib$ is a complex number then $\bar{z} = a - ib$ is called the conjugate of z s.t the number a is called the real part and b is called the imaginary part.

Euclidean space :- الفضاءات الإقليدية

Let k be any positive integer then

$$R^k = \{ x = (x_1, x_2, ---, x_k) ; x_1, x_2, ----, x_k \in \mathbb{R} \}.$$

elements of R^k are called points or vectors.

and $x_1, x_2, ----, x_k$ are called the Coordinates of x.