**Theory of function 1(Solution set 1)**

**1.**What are the purely real and purely complex number? . Describe with examples

Solution:

Purely real number:

The type of number we normaly use such as 1 , 15.34 , -0.1 , ¾ etc Real number are positive , negative , fractional etc.

Purely complex number:

An order pair (a,b) where a and b are real numbers is called a complex number. Here a is called the real part and b is called the imaginary part of the complex number (a , b).Example :The complex number z = ( a + b) is denoted by z = a + ib.

2.Find the real and imaginary part of each of the following.

Soluton:

(i) f(z) = z2 , Real part z2 and imaginary part 0

(ii) f(z) = ez , Real part ez and imaginary part 0

(iii) f(z) = 1/z , Real part 1/z and imaginary part 0

(iv) f(z) = = × = =

Real part and imaginary part = -2i

3.Find the absolute value and conjugate of each of the following.

(i) –2 + i (ii)( 2 + i)(4 + 3i) (iii)

Solution: Absolute value

(i)|-2 +i| = =

(ii)(2 + i) (4 + 3i) = 8 + 6i + 4i +3.i2 = 5 + 10i

|(2 + i) (4 + 3i)| = = = 15

(iii) = × =

|| = = 2/7

Conjugate

` (i) = -2 – i

(ii) = 8 + 6i + 4i +3.i2 = 5 + 10i

= 5 – 10i

(iii) = × =

=

4.Show that z is real number if and only if z =

Solution: Let z is real number z can be written as z = a + b then = a + b hence z =

Let z = suppose z = a + b .....\*

= a + b ......\*\*

Add (\*) and(\*\*) z + = 2(a + b)

2z = 2( a + b) => z = (a + b)

5.Find the sixth root of unity.

Solution: let z6 = 1

z6 = 1

= 1 + 0.i

= cos00 + isin00  ( By De’moivrs theorm)

z = { 1( cos00 + isin00)}1/6 = (1)1/6[ cos00 + isin00]1/6 = (1)1/6[cos(0+k2П)0 + isin(0 + k2П)0]

= cos(2k0 + isin(2k0

= cos(k0 + isin(k0

Now for the sixth roots putting k = 0,1,2,3,4,5 we get roots are resprctively.

1 , + , - + , -1 , - , - -

6.If z is complex number such that |z| = 1 prove that is purely imaginary , what will your conclusion if z = 1 ?

Solution: Let us suppose z = i then we know |z | = 1

= = = = i is purely imaginary. If z = 1 we find undefined form.