**DEPARTMENT OF MATHEMATICS**

**15B11MA211 MATHEMATICS 2**

**Tutorial Sheet 9 B.Tech. Core**

**Limits, Continuity, Differentiability and Analytic Functions**

1. Evaluate the following limits if they exist.

 

1. (a) Show that f(z) =  is continuous but not differentiable at any point.

(b) If f(z) = x2+ iy2, does f′(z) exist at any point?

1. Determine whether C-R equations are satisfied for the following functions

(a) 1/z (b) 2x + ixy2.

1. Show that f(z) = | | is differential at z = 0 but not analytic there.
2. Show that for the function   
   C-R equations are satisfied at origin, but function is not analytic at the point.
3. Determine the analytic function f(z) = u + iv, where

(a) u = x3 – 3xy2 + 3x2 - 3y2 + 1 (b) u = x(1-y)

(c) v = (x – y)/( x2 + y2) (d) v = ex siny

1. If and is an analytic function of , find in terms of .
2. Find the analytic function, given that .

Ans:

1. (a) –iz (b) 

6. (a) z3 + 3z2 + C (b) z + iz/2 + C (c) (1 +i)/z + c (d) ez +b + C.

7.

8.

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