**Final Exam Math 487**

**Question1**

**Prove or disprove each of the following statements**

i-Log is harmonic in every domain which does not contain the origin.

ii-If f and are analytic a domain D, then f is constant in D.

iii-

iv-If f has a pole of order m at then f' has a pole of order m+1 at

**Question2**

i- Compute

ii-Find the domain of analyticity of

iii-If is the arc of the circle that lies in the first quadrant ,show that :

**Question3**

i-Show that If ( is a sequence of functions that is analytic in a simply connected domain D converging uniformly to f in then f is analytic in D.

ii-Find and state the convergence properties of Taylor series for:

iii-Let .Compute

**Question4**

i-Show that if f is analytic and has a zero of order m at the point then the function has a simple pole at with .

ii-Classify the zeros of

iii-Classify the isolated singularities of:

a) b).

**Question5**

i-For the function find the Laurent series expansion in the regions:

a)

b)

ii-Evaluate: a)

iii) Show that:

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GOOD LUCK