RUTGERS
UNIVERSITY | NEWARK

21:640:403
Complex variables

Fall 2016

Quiz #8

Monday, November 28 2016

Duration: 20 min

NAME: ________________________

Please write clearly and properly.

Problem	**Grade**
1	
2	
Total	

Problem 1 (~ 4 points.)**.**
Find the radius of convergence and the domain of convergence of each of the following power series:

(1)

$$\sum_{n=0}^{+\infty} e^{-4i-n}\, z^n$$

(2)

$$\sum_{n=0}^{+\infty} \frac{2^n}{n^2} (z + i - 1)^n$$

Problem 2 ($\sim$ 7 points.)**.**
True or false? No explanations are required.

(1) A power series always converges at least at one point of the boundary of its domain of convergence.

(2) Some power series converge for no value of $z \in \mathbb{C}$.

(3) Some power series converge for every value of $z \in \mathbb{C}$.

(4) A power series converges uniformly in its domain of convergence.

(5) A power series converges pointwise in its domain of convergence.

(6) A power series is analytic in its domain of convergence.

(7) A polynomial function is analytic on $\mathbb{C}$.

(8) An analytic function is locally the uniform limit of a sequence of polynomials.

(9) Every analytic function is holomorphic.

(10) Every holomorphic function is analytic.

(11) Some analytic functions are discontinuous.

(12) Let f be an analytic function on $\mathbb{C}$. Then the coefficients of its power series representation at $z_0 \in \mathbb{C}$ do not depend on z_0.

(13) Let f be an entire function. For any $z_0 \in \mathbb{C}$, there exists a power series centered at z_0 which represents f, and the radius of convergence is $R = +\infty$.

(14) Let f be an analytic function defined in a disk $D(a, r)$. Assume that $f^{(n)}(a) = 0$ for every positive integer n. Then f is a constant function.