Quiz #2

Monday, September 26 2016

NAME: _____

Please write clearly and properly.

Problem	Grade
1	
2	
Total	

Problem 1 (~ 6 points.). Are the following sequences of complex numbers $(z_n)_{n \in \mathbb{N}}$ converging, yes or no? If yes, give the limit. *No explanations are required.*

(1) $z_n = \dfrac{1 + 3i}{1 + n}$

(2) $z_n = e^{ni\pi/2}$

(3) $z_n = e^{-n+i\pi}$

(4) $z_n = 2i - \dfrac{e^{ni\pi/2}}{n}$

(5) $z_n = (1 - i)^n$

(6) $z_n = \left(\dfrac{1 - i}{2}\right)^n$

Problem 2 ($\sim$ 8 points.). For each one of the sets $A_k \subseteq \mathbb{C}$ ($1 \leqslant k \leqslant 4$) defined below, answer the following questions:

- Is A_k open?

- Is A_k closed?

- Is A_k compact?

- Is A_k connected?

No explanations are required.

(1) $A_1 = \left\{ z \in \mathbb{C}^* : \dfrac{\pi}{8} < \text{Arg}(z) \leqslant \dfrac{\pi}{4} \right\}$.

(2) $A_2 = \{ z \in \mathbb{C} : 1 \leqslant Re(z) \leqslant 2 \}$

(3) $A_3 = \overline{D(0, 2)} \cup \overline{D(2i, 1)}$

(4) $A_4 = D(0, 5) - D(1, 1)$.