

Analysis 1  
Quiz 3

Name: \_\_\_\_\_

You have 10 minutes to complete this quiz. If you have a question raise your hand and remain seated. In order to receive full credit your answer must be **complete**, **legible** and **correct**. Show your work, and give adequate explanations.

1. Write down a formal statement that asserts “ $(a_i)_{i \in \mathbb{N}^*}$  diverges”.

$$(\forall L) (\exists \varepsilon > 0) (\forall N) (\exists i) ((i > N) \wedge ( \underbrace{|a_i - L| \not\leq \varepsilon}_{|a_i - L| \geq \varepsilon \text{ is OK here}} ))$$

2. Write down a strategy establishing that the alternating sequence  $(1, -2, 3, -4, 5, -6, \dots)$  diverges. (You do not have to justify your strategy, just say what it is.)

A strategy for  $\exists$ :

$\forall$ : Chooses some  $L$ . ( $\exists$  cannot control this choice.)

$\exists$ : Chooses  $\varepsilon = 1$ .

$\forall$ : Chooses some  $N$ . ( $\exists$  cannot control this choice.)

$\exists$ : Needs to choose  $i$  so that  $i > N$  and  $|a_i - L| \geq 1$ .

Choose any  $i$  such that  $i > \max(N, |L| + 1)$ .