October 10th, 2019 **Writing Of Mathematics**[1] **Quiz 8**

http://www.isibang.ac.in/~athreya/Teaching/wom19

Name: ________________________ **Score:** [ ]

1. Let $x_n = \begin{cases} 3 + \frac{1}{n} & \text{if } n \text{ is odd} \\ -6 - \frac{1}{n} & \text{if } n \text{ is even} \end{cases}$

Fill in the boxes:

1. The set of limit points $E =$ [ ].

2. $S_k = \sup\{x_n : n \geq k\} =$ [ ] and $\lim_{k\to\infty} S_k =$ [ ] $=$ [ ] (E).

3. $I_k = \inf\{x_n : n \geq k\} =$ [ ] and $\lim_{k\to\infty} I_k =$ [ ] $=$ [ ] (E)

4. Fix $\epsilon = 0.001$

   (a) If we take $N =$ [ ] then for $n \geq N$, $x_n < 3 + \epsilon$

   (b) Let $M \in \mathbb{N}$. If we take $m =$ [ ] then $m \geq M$ and $x_m > 3 - \epsilon$

   From (a) and (b) we can conclude that

   (i) For all [ ] many $n \in \mathbb{N}$ we have x_n [ ] $3 + \epsilon$

   (ii) For [ ] many $n \in \mathbb{N}$ we have x_n [ ] $3 - \epsilon$

5. Fix $\epsilon = 0.005$

   (a) If we take $N =$ [ ] then for $n \geq N$, $x_n > -6 - \epsilon$

   (b) Let $M \in \mathbb{N}$. If we take $m =$ [ ] then $m \geq M$ and $x_m < -6 + \epsilon$

   From (a) and (b) we can conclude that

   (i) For [ ] many $n \in \mathbb{N}$ we have x_n [ ] $-6 + \epsilon$

   (ii) For all [ ] many $n \in \mathbb{N}$ we have x_n [ ] $-6 - \epsilon$

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[1] No justification is required but please do all rough/fair work on the sheet and the backside