MAT 319/320: Basics of Analysis, Spring 2018
First-Day Mini-Quiz (12 mins)

1. $10^{\ln 6} - 6^{\ln 10}$ equals

(A) 0   (B) 1   (C) -1 (D) $4^{-\ln 4}$ (E) $\dfrac{1}{256}$

Answer only

2. $\dfrac{x^2 - x - 2}{x^2 - 1}$ equals

(A) $1 - \dfrac{1}{x-1}$ (B) $1 + \dfrac{1}{x-1}$ (C) $1 - \dfrac{1}{x+1}$ (D) $1 + \dfrac{1}{x+1}$ (E) $-1 + \dfrac{1}{x+1}$

Answer only

3. Let $a_1, a_2, \ldots$ be the sequence defined recursively by

$$a_1 = 1, \qquad a_{n+1} = \frac{a_n + 9}{2} \quad \forall\, n \geq 1.$$

(a) Use mathematical induction to show that $a_n \leq 9$ for all $n \geq 1$.

(b) Use mathematical induction to show that $a_n \leq a_{n+1}$ for all $n \geq 1$.

(c) Show that the sequence a_n converges and find its limit.