

Quiz 2

MATH 11A - Discussion Section C
February 1, 2017

Name & ID # : _____

Directions: Leave your final answer in exact form and box it in. You are more than welcome to write on the back if you find it necessary.

Definition: A limit of a sequence or function is defined only when the sequence or function approaches a single finite value in the real numbers.

(1) Consider the difference equation given by:

$$\mathcal{P}_{t+1} = \lambda \mathcal{P}_t \quad \text{where} \quad \mathcal{P}_0 = 1$$

Evaluate:

$$\lim_{t \rightarrow \infty} P_t$$

given:

- (a) $\lambda \in (-\infty, -1)$
- (b) $\lambda = -1$
- (c) $\lambda \in (-1, 1)$
- (d) $\lambda = 1$
- (e) $\lambda \in (1, \infty)$

(2) Determine whether the following sequence is convergent or divergent:

$$a_n = \frac{e^n + e^{-n}}{e^{2n} - 1}$$

If it is convergent determine its limit.