

Quiz 4 — 09/28/17

Name: _____ Section and/or TA: _____

Answer all questions in a clear and concise manner. Unsupported answers will receive *no credit*.

1. (2 points) Find the limit of the sequences $\{a_n\}_{n=1}^{\infty}$ defined as follows

(a) (1 point) $a_n = \frac{2n^2 + 6n - 25}{7n^2 + 100n - 3456}$

Solution:

$$\lim_{n \rightarrow \infty} \frac{2n^2 + 6n - 25}{7n^2 + 100n - 3456} = \frac{2}{7}$$

(b) (1 point) $a_1 = 3, a_n = 6 - a_{n-1}$ for $n \geq 2$.

Solution: $a_n = a_1 = 3$ for all n , so $\lim_{n \rightarrow \infty} a_n = 3$.

2. (1 point) Find $\sum_{n=0}^{\infty} \frac{3^n}{5^n}$.

Solution: This is a geometric series so $\sum_{n=0}^{\infty} \frac{3^n}{5^n} = \frac{1}{1 - \frac{3}{5}} = \frac{5}{2}$.

3. (1 point) True or False: The series $\sum_{n=1}^{\infty} a_n$ converges if $\lim_{n \rightarrow \infty} a_n = 0$.

Solution: False. For example, the series $\sum_{n=1}^{\infty} \frac{1}{n}$ diverges but $\lim_{n \rightarrow \infty} \frac{1}{n} = 0$.

4. (1 point) True or False: Let $\{s_n\}$ be the sequence of partial sums of the series $\sum_{n=1}^{\infty} a_n$. If

$\{s_n\}$ diverges, then $\sum_{n=1}^{\infty} a_n$ diverges.

Solution: True. A series converges if and only if the sequence of its partial sums converge.