

Score: _____ / 20

1. Given the sequence: $a_n = \left\{ \frac{3n^2+2}{n^2} \right\}$

- a) [2 pt] The sequence converges to _____
- b) [2 pts] Finish the sentence: We can show the convergence of part (a) above because for all neighborhoods, no matter how small, we can find a natural number M value such that...

- c) [3 pts] If the neighborhood has a value of $E = 0.1$, find the natural number value of M from part (b).

2. Tell whether each statement is True or False. [1 pts each]

- a) If a sequence does not converge, it must diverge. _____
- b) If a sequence is bounded above and below, it must converge. _____
- c) If a sequence is bounded below and everywhere decreasing, it must converge. _____
- d) If it can be shown that for $n > 8$, all the terms of a_n are greater than n , the sequence $\{a_n\}$ must diverge. _____
- e) ALL sequences that converge are bounded below. _____

3. Given the sequence: $a_n = \left\{ \frac{2n}{n+1} \right\}$

- a) [3 pts] Show that the sequence is bounded above.

- b) [3 pts] Show that the sequence is everywhere increasing.

- c) [2 pts] What can you conclude from parts (a) and (b) together?