

Math347, Spring 2018, Homework #7
Due to Wednesday, February 14, 2018

HW7.1. Use the definition to prove that $\lim_{n \rightarrow \infty} \sqrt{1 + \frac{1}{n}} = 1$.

HW7.2. Use the definition to show $\lim_{n \rightarrow \infty} \left(\frac{n^2 - 1}{2n^2 + 3} \right) = \frac{1}{2}$.

HW7.3. Use definition to show that $\lim_{n \rightarrow \infty} x_n = 0$ if and only if $\lim_{n \rightarrow \infty} |x_n| = 0$.

HW7.4. Prove that if $\lim x_n = x > 0$, then there exists a natural number M such that $x_n > 0$ for all $n \geq M$.

HW7.5. If (b_n) is a bounded sequence and $\lim a_n = 0$. Show that $\lim a_n b_n = 0$.

HW7.6. Let $\{x_n\}$ be a sequence of real numbers.

- a) State the definition that the sequence $\{x_n\}$ does not converge to x .
- b) Use the definition to show that the sequence $x_n = (-1)^n + \frac{1}{n}$ does not converge to $x = 1$.