# HOMEWORK #3 – MATH 3210, FALL 2019

DUE TUESDAY, SEPTEMBER 10TH

**2.1, #4.** Guess the limit of the sequence $a_n = \frac{1}{n^2}$ and then prove your guess is correct.

**2.1, #6.** Guess the limit of the sequence $a_n = \frac{(-1)^n}{n}$ and then prove your guess is correct.

**2.1, #8.** Guess the limit of the sequence $a_n = \sqrt{n+1} - \sqrt{n}$ and then prove your guess is correct.

**2.1, #11.** Prove that if $a_n \longrightarrow 0$ and $k$ is any constant, then $ka_n \longrightarrow 0$.

**2.2, #2.** Guess the value of $\lim \frac{n}{n^2+2}$ and then prove your guess is correct.

**2.2, #4.** Guess the value of $\lim \left(\frac{n}{n+1}\right)^2$ and then prove your guess is correct.

**2.2, #9.** Does the sequence $\{\cos(n\pi/3)\}$ have a limit? Justify your answer.

**2.2, #15.** For a certain sequence $\{a_n\}$, there is an $\epsilon > 0$ such that every millionth term of the sequence is greater than $\epsilon$. Can such a sequence converge to zero? Justify your answer.