MIDTERM #1 INFORMATION – MATH 3210
FALL 2018

- The first page will be short answer questions. I may ask you to define terms. I may ask you to state a theorem. I may ask you to prove something very short. I may ask you for an example of something (like a bounded sequence that does not converge, perhaps a convergent sequence that is not monotone, a set with lower greatest lower bound, etc.)
- The second page will ask you to prove that a specific sequence either converges, or does not converge. Or that a specific function is continuous or not continuous.
- The third page will be a more abstract proof.
- The fourth page will ask you to prove one of the following 5 theorems.
  (a) That the field of real numbers has the Archimedean property, using the completeness axiom. Theorem 1.4.8 in the text.
  (b) That a convergent sequence (in $\mathbb{R}$) cannot have two different limits. Theorem 2.1.6 in the text.
  (c) The Bolzano-Weierstrass theorem (you may use the Nested Interval Property). Theorem 2.5.5. in the text.
  (d) That if $f : I \longrightarrow \mathbb{R}$ is continuous from a *closed* interval I, then f attains a maximum value on I (in other words, $\sup(f(I)) \in f(I)$). Theorem 3.2.1 in the text.
  (e) That if f is a continuous function on a closed and bounded interval I, that f is uniformly continuous on I. Theorem 3.3.4 in the text.
- The fifth page will be an extra credit problem (worth up to +10 points to the exam, out of 100). It will require a more subtle proof.