

1. Abbott 7.2.1
2. Abbott 7.2.4a
3. Suppose  $f, g : [a, b] \rightarrow \mathbb{R}$  are bounded functions. Suppose also that  $g(x) = f(x)$  for all  $x$  except at one point  $c \in [a, b]$ .
  - a) Prove that  $U(f) = U(g)$  and  $L(f) = L(g)$ .
  - b) Prove that if  $f$  is integrable, so is  $g$ .
  - c) Suppose  $h$  is an integrable function and  $\hat{h}(x) = h(x)$  except at finitely many points. Show that  $\hat{h}$  is integrable.
4. Abbott 7.2.6
5. Abbott 7.4.1
6. Abbott 7.4.5
7. Abbott 7.2.5 (**Hand this one in to David.**)

For this problem, you will need to know the definition of **uniform convergence**. We say a sequence of functions  $(f_n)$  with domain  $[a, b]$  converges uniformly to  $f$  if for any  $\epsilon > 0$ , there exists an  $N \in \mathbb{N}$  such that if  $n \geq N$  then  $|f(x) - f_n(x)| < \epsilon$  for every  $x \in [a, b]$ .