**Real Analysis HW 11**

1. True or false:
   1. If on *[a, b]*
   2. If for all then on *[a, b]*
   3. If *f* is continuous on *[a, b]* and for all then on *[a, b]*
2. Decide if the following function sequences converge or converge uniformly. *Hint: for some sequences it might help to keep in mind what uniform convergence would imply for the limit function*
   1. on . How about on ?
   2. .
   3. on . How about on ?
   4. on . How about on ?
   5. on ?. How about on
3. Consider . Find the limit function and show that converges uniformly to *f* for all x in ***R***. Then calculate
4. Show that if *fn* are *uniformly* continuous on D and *fn* converges uniformly to *f*, then *f* is *uniformly* continuous.
5. Show that if *fn* and *gn* both converge uniformly to f and g, respectively, then *fn + gn* is uniformly convergent to *f + g*
6. Show that if *fn* and *gn* both converge uniformly to f and g, respectively, then *fn gn* does not necessarily converge uniformly (i.e. find a counter-example).
7. Show that if *fn* and *gn* both converge uniformly to f and g, respectively, and *|fn | < M* and  *|gn* *| < M* for all *n* then *fn gn* converges uniformly to *f g*.
8. How that if then converges uniformly to a continuous function.
9. If is a series of continuous function which converges uniformly on [a, b] to a function *g*. Then