

## Homework # 31

Read pp. 173 - 186.

Need to know: Definitions of pointwise and uniform convergence 6.2.1 and 6.2.1.

Cauchy criterion 6.2.5 (With proof), Thm 6.2.6 (With proof), Thm. 6.3.3 (with proof).

Do the following problems:

1. Do all the steps in problem 6.2.1 for the sequence

$$f_n(x) = \frac{n x^2}{1 + n x^4}.$$

2. Let  $g_n(x) = \frac{x^n - 1}{x^n + 1}$

- (a) Find the pointwise limit on  $[0, +\infty)$
  - (b) Explain how we know that the convergence cannot be uniform on  $[0, +\infty)$
  - (c) Show that the convergence is uniform on  $[0, \frac{1}{2}]$  and on  $[2, +\infty)$ .
3. Do # 6.2.5 and 6.2.9