

*Math 251*  
*Jonny Comes*  
*Winter 2006*  
*Assignment #3*  
*Due Wednesday Jan. 25*

**From the Textbook:**

- Section 2.5: 3, 4, 17, 18, 45
- Section 2.6: 3, 4, 11, 12, 16, 37, 45

**Additional Exercises:**

1. This problem is meant to show you that when proving  $\lim_{x \rightarrow a} f(x) = L$  using the  $\varepsilon \delta$  definition, your choice of  $\delta$  will depend on  $a$ .
  - (a) Prove that  $\lim_{x \rightarrow 0} (x^2 + 4x + 2) = 2$  using the  $\varepsilon, \delta$  definition of limits.
  - (b) Prove that  $\lim_{x \rightarrow 1} (x^2 + 4x + 2) = 7$  using the  $\varepsilon, \delta$  definition of limits.

Extra Credit: Write down the rule of a function whose domain is all real numbers, but is nowhere continuous

[i.e. a function  $f$  such that  $\lim_{x \rightarrow a} f(x) \neq f(a)$  for **every** real number  $a$ .]