

Math 305, Problem Set #8
(due **by email** Friday, 11/13/09, 10:30 a.m.)

Abbott, section 4.4, problems 6, 7, and 9. Note that for problem 4.4.9, the definition of Lipschitz should say “for all $x, y \in A$ with $x \neq y$ ” rather than “for all $x, y \in A$ ” (if $x = y$, the difference quotient $(f(x) - f(y))/(x - y)$ is not defined).

Abbott, section 4.5, problems 2, 3, and 7. (Hint for problem 7: Consider the function $g(x) := f(x) - x$.)

Extra problem A: Let g be defined on all of \mathbf{R} . Show that g is continuous if and only if $g^{-1}(F)$ is closed whenever F is closed. (Compare with Exercise 4.4.11.) Hint: Use Theorem 3.2.13.)

Note: In your solution to a problem, you may appeal to the results proved on the homework in earlier problem sets or the current problem set (as long as you don’t engage in circular reasoning).

Please don’t forget to write down **who you worked on the assignment with** (if nobody, then write “I worked alone”), and record **how much time you spent on each problem** (this doesn’t need to be exact).