Homework 6 – due 03/19/04

Math 341

Recommended problems:

Problems to be handed in:

1. Braun 1.9, # 20.

2. Braun 1.10, # 9, 14.

3. Braun 1.12, # 2, 3 (Do for $h = 0.1$ and $h = 0.05$ only.)

4. Braun 1.12, # 7.

5. Consider the functions $f_n(x) = x^n$ on the interval $[0, 1]$. Let $f(x)$ be the function

$$f(x) = \begin{cases} 0 & \text{if } 0 \le x < 1 \\ 1 & x = 1. \end{cases}$$

(a) Show that $f_n \to f$ pointwise but not uniformly on $[0, 1]$.
(b) Show that the same holds on the interval $[0, 1)$.
(c) Show that on any interval $[0, 1 - \epsilon]$, where $\epsilon > 0$ is less than 1, f_n converges uniformly to the zero function.