MATH 131P: PROBLEM SET 7
DUE WEDNESDAY, NOVEMBER 14, 2012

Do the following problems from the textbook: Lesson 20:1,4,5,6,7, Lesson 21:1,2, Lesson 22:1, Lesson 23:1,3,4,5, as well as the following problem:

Problem 1. Using the additional problem on Problem set 6 concerning the Fourier transform of $f(x) = e^{-ax^2}$, $a > 0$, show that if $f(x) = e^{-ax^2}$, then $\mathcal{F}^{-1}(\mathcal{F}f) = f$ indeed, where $\mathcal{F}$ is the Fourier transform and $\mathcal{F}^{-1}$ is the inverse Fourier transform (defined as $(\mathcal{F}^{-1}g)(x) = \frac{1}{\sqrt{2\pi}} \int_{\mathbb{R}} e^{ix\xi} g(\xi)\, d\xi$). (Hint: relate the inverse Fourier transform of $g(\xi) = e^{-b\xi^2}$ to its Fourier transform, $\frac{1}{\sqrt{2\pi}} \int_{\mathbb{R}} e^{-ix\xi} g(\xi)\, d\xi$.)