Homework 8

The following are due on Monday, March 12:

§5.2 # 1, 2, 3, 14, 17.

(Hint for 17: do the inner integral first, letting $y = x\tan(\theta)$. You will need to be comfortable with the next section, because the inner integral will have a function of x as a limit. After simplification, you should be integrating $\sin(2\arctan(1/x))/2x$. Use the double angle formula $\sin(2\theta) = 2\sin(\theta)\cos(\theta)$.)

§5.3 # 4, 15, 18.

§5.4 # 4, 5, 6, 9, 11. Extra credit: 18.

Extra Credit: Using the strategy of the hint in #18 from 5.4, evaluate $\int_0^\infty e^{-x^2}dx$, substituting $y = tx$ after using the hint. Find a constant c such that $\int_{-\infty}^{\infty} e^{-cx^2}dx = 1$.[1]

[1] For any c, μ, the function $e^{-c(x-\mu)^2}$ is a normal distribution (also called a Gaussian) with mean μ and variance $1/2c$.