Mathematics 170A – HW8 – Due Tuesday, March 6, 2012.

Problems 5,6,11,12 on pages 186-188.

J_1. A point (X, Y) is chosen uniformly from the unit square $[0, 1] \times [0, 1]$. Find the CDF and PDF of the random variable $Z = X + Y$.

J_2. Suppose X is exponentially distributed. If $P(X \geq .01) = \frac{1}{2}$, find a number x so that $P(X \geq x) = .9$.

J_3. Suppose X is uniform on $[0, 2a]$. Find the CDF of $Y = \min(X, a)$.

J_4. Suppose X has CDF

$$F(x) = \begin{cases} 0 & \text{if } x < 0; \\ \frac{x}{3} & \text{if } 0 \leq x < 1; \\ \frac{x}{2} & \text{if } 1 \leq x < 2; \\ 1 & \text{if } x \geq 2. \end{cases}$$

(a) Find $P(\frac{1}{2} \leq X \leq \frac{3}{2})$.
(b) Find $P(\frac{1}{2} \leq X \leq 1)$.
(c) Find $P(\frac{1}{2} \leq X < 1)$.
(d) Find $P(1 \leq X \leq \frac{3}{2})$.
(e) Find $P(1 < X < 2)$.

J_5. Suppose X has PDF $f(x)$. Find the PDF of $Y = |X|$.

J_6. Suppose X has a symmetric density $f(x)$ (so that $f(-x) = f(x)$). Find f if X^2 is exponentially distributed with parameter λ.