# Math 671 - Assignment 5 - Due October 7

(We'll do some work in class on Oct. 2nd that might help with problems 2-4)

1. A point is chosen "at random" from in the unit square, and its distance $X$ from the nearest side of the square is measured. What is the CDF of $X$? ("At random" means uniform measure on the interior of the square.)

2. Suppose that $X$ is a discrete random variable with pdf

$$f_\lambda(n) = K \frac{\lambda^n}{n!}, \ldots n = 0, 1, 2, \ldots$$

   . (a) Find the constant $K$. (b) Find $E(X)$, $Var(X)$.

3. Suppose that $X$ and $Y$ are independent random variables with the distribution from the previous problem. Find the pdf for $X + Y$.

4. Suppose $X \sim Exp(\lambda)$. Find $E(X), Var(X)$. What is the pdf of $Y = X^2$?

5. If $X_n$ is a sequence of IID random variables which are not a.s. constant then $P(\lim_{n \to \infty} X_n \text{ exists}) = 0$.