MATH 464 (THEORY OF PROBABILITY)
HOMEWORK 9

FALL 2017

Due on: Thursday 11-02-2017.

(1) Show that $\mathbb{E}\left((X-\alpha)^2\right)$ is minimized when $\alpha = \mathbb{E}(X)$.

(2) Suppose that X and Y have joint uniform density function over the set $\{(x,y) \in \mathbb{R}^2;\ 0 < y < x < 1\}$. Find $P(X+Y > z)$, where $z > 0$ is a constant.

(3) Suppose X_1 and X_2 are independent standard normal random variables. Find the distribution of $Y = (X_1^2 + X_2^2)^{1/2}$.
Note: This is called the *Rayleigh distribution.*