ELEG 3143 Assignment # 8

1. A Gaussian random variable X has a probability of 0.5 of having value less than 1.0. It has a probability of 0.0228 of having a value greater than 5.0.

   (a) Find $\mathbb{E}[X]$ and $\mathrm{Var}[X]$.

   (b) Find $\Pr(X \leq 3)$.

2. A random variable X is Gaussian distributed with mean 0 and variance 1. Define $Y = X^3$. Find the pdf of Y.

3. (Matlab question) The Matlab function **randn** can be used to generate standard Gaussian random variables. Use Matlab to generate 10,000 independent Gaussian random variables with mean 2 and variance 4. (Use the Matlab **help** command for detailed descriptions of the Matlab functions used in this problem.)

   (a) Plot the histogram of the 10,000 samples (use the Matlab function **hist**).

   (b) Find the emperical average and variance of the 10,000 samples (use the Matlab functions **mean** and **var**).

4. The pdf of the RV X is given as follows. Define $Y = X^2$.

$$f_X(x) = \exp(-2|x|)$$

   (a) Find the pdf of Y.

   (b) Find $\Pr(Y > 2)$.

5. The pdf of the RV X is given as follows. Define $Y = 3X - 4$.

$$f_X(x) = \exp(-2|x|)$$

(a) Find the pdf of Y.

(b) Find $\Pr(Y > X)$.