

Assignment #13

Due on Wednesday, March 7, 2012

Read Section 4.3 on *Variance* in DeGroot and Schervish.

Read Section 4.3 on *Moments* in DeGroot and Schervish.

Do the following problems

1. Compute the moment generating function, $\psi(t)$, of a continuous random variable X with Uniform($-1, 2$) distribution. What should $\psi(0)$ be? Give also the second moment and variance of X .

2. Suppose that one word is selected at random from the sentence

THE GIRL PUT ON HER BEAUTIFUL HAT.

If X denotes the number of letters in the word that is selected, what is the value of $\text{var}(X)$?

3. Suppose that X is a random variable for which $E(X) = \mu$ and $\text{var}(X) = \sigma^2$. Show that

$$E[X(X - 1)] = \mu(\mu - 1) + \sigma^2.$$

4. Suppose that X is a random variable for which the mgf is as follows:

$$\psi_X(t) = e^{t^2+3t} \quad \text{for } -\infty < t < \infty.$$

Find the mean and variance of X .

5. Suppose that X is a random variable for which the mgf is as follows:

$$\psi_X(t) = \frac{1}{6}(4 + e^t + e^{-t}) \quad \text{for } -\infty < t < \infty.$$

Find the probability distribution of X .