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ECONOMICS 6331 – Probability and Statistics, Fall 2007

Homework 8. Monday October 29, 2007. We will do this together in class Friday November 2nd.

1. Ramanathan, Practice Problem 5.9, page 99.

2. Ramanathan, Practice Problem 5.10, page 99.

3. Let X and Y be normally distributed variables with means μ_x and μ_Y, resp., and variances σ_X^2 and σ_Y^2, resp.

a) Show that the random variable

$Z = X + Y$,

is normally distributed and find its mean and variance. (Hint: Find the Moment Generating Function. Use the law of iterated expectations.)

b) Argue, using the result in part a), that if $X_1, X_2, ..., X_n$ are normally distributed random variables with means $\mu_1, ..., \mu_n$, and $a_1, a_2, ..., a_n$ are constants then $a_1 X_1 + a_2 X_2 + ... + a_n X_n$ is a normally distributed random variable and state its mean and variance.

c) What is the distribution of the mean $\overline{X} = \frac{1}{n}\Sigma_{i=1}^{n} X_i$?

4. Ramanathan, Exercise 5.5, page 118.