Sta347 Probability I

Homework 4

Nov. 21, 2013

Due Nov. 28, 2013 in class

- You should work out this Homework individually. Group works or discussions are not acceptable.
- No late Homework will be accepted.

(1) Problem 4 on Page 144 of the Textbook.

(2) Problem 5 on Page 144 of the Textbook.

(3) Problem 3 on Page 146 of the Textbook.

(4) Problem 4 on Page 146 of the Textbook.

(5) Problem 5 on Page 146 of the Textbook.

(6) i. Suppose that random variable X is a function of random variable Y; In other words, $X = f(Y)$ for some function f. Show that $E[XZ|Y] = XE[Z|Y]$ almost surely for any random variable Z.

ii. Show that $\text{Cov}(W, V) = \text{Cov}(W, E(V|W))$.

(7) Prove the following conditional Cauchy's Inequality: If $E(X^2) < \infty$ and $E(Y^2) < \infty$. Then

$$(E(XY|Z))^2 \leq E(X^2|Z)E(Y^2|Z) \text{ almost surely.}$$