5. Homework

Due: October 29, 2008, before the class

Use your words for the solutions, show your reasoning. A correct solution is a correct answer that is correctly reasoned.

1. Consider the two dimensional random variable $\mathbf{U}' = (X, Y)$ with density function

$$f(x, y) = \begin{cases} \frac{6}{7}(x + y)^2 & \text{if } 0 \leq x \leq 1, \ 0 \leq y \leq 1, \\ 0 & \text{otherwise.} \end{cases}$$

(a) (2 pts.) Prove that the above $f(x, y)$ is a density function.

(b) (2 pts.) Find the marginal densities of $X$ and $Y$.

(c) (6 pts.) By integrating over the appropriate regions find

(i) $P(X > Y)$

(ii) $P(X + Y \leq 1)$.

Problems from the book pp 261–262.

5.1 a–c (10 pts)

5.9 a–e (5 pts each) In part (b) determine the directions and length of the axis of the confidence ellipse.