

Math 262

Section 4.2

Day 29

1. Let X and Y have joint pdf $f(x, y) = 6xy^2$ for $0 \leq x \leq 1$ and $0 \leq y \leq 1$ (same as last time).
 - (a) Sketch the marginal pdfs $f_X(x)$ and $f_Y(y)$. *Discuss with your neighbor:* What would you estimate to be the means $E(X)$ and $E(Y)$?

 - (b) Now compute $E(X)$ and $E(Y)$.

 - (c) What are *two* different ways of finding $E(X + Y)$? *Discuss with your neighbor.*

 - (d) Compute $E(X + Y)$ in two different ways. (You may use technology to evaluate the integrals.)

 - (e) Now compute $E(XY)$.

 - (f) How do $E(X)$ and $E(Y)$ relate to $E(XY)$? *Discuss with your neighbor.*

 - (g) What are the values of $\text{Cov}(X, Y)$ and $\text{Corr}(X, Y)$? (Try to do this without evaluating any more integrals.)

2. Now let X and Y have joint pdf $f(x, y) = 3x + 3y$ for $0 \leq x$, $0 \leq y$, and $x + y \leq 1$.

(a) Sketch the joint pdf and verify that the volume underneath is 1.

(b) *Discuss with your neighbor:* What values of X and Y are most likely? What values are not so likely?

(c) Compute the following, using technology to evaluate integrals:

- $E(X + Y)$

- $E(XY)$

- $E(X)$

- $E(Y)$

(d) How do $E(X)$ and $E(Y)$ relate to $E(X + Y)$ and $E(XY)$? Does independence play a role?

(e) What is $\text{Cov}(X, Y)$?