

# Math 262

## Section 4.2

Day 29

- Let  $X$  and  $Y$  have joint pdf  $f(x, y) = 6xy^2$  for  $0 \leq x \leq 1$  and  $0 \leq y \leq 1$ .
  - Sketch the marginal pdfs  $f_X(x)$  and  $f_Y(y)$ . What would you estimate to be the means  $E(X)$  and  $E(Y)$ ?
  - Compute  $E(X)$  and  $E(Y)$ .
  - Compute  $E(X + Y)$  in two different ways.
  - Now compute  $E(XY)$ .
  - What are the values of  $\text{Cov}(X, Y)$  and  $\text{Corr}(X, Y)$ ? (Try to do this without evaluating any more integrals.)

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

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