HW 9-2 (Due Nov. 15, 2016) **Name:**

Print then work on it directly. Staple HW 9-1 and 9-2 together.

Problem 1

5.24 In Exercise 5.6, we assumed that if a radioactive particle is randomly located in a square with sides of unit length, a reasonable model for the joint density function for Y_1 and Y_2 is

$$f(y_1, y_2) = \begin{cases} 1, & 0 \le y_1 \le 1, 0 \le y_2 \le 1, \\ 0, & \text{elsewhere.} \end{cases}$$

a Find the marginal density functions for Y_1 and Y_2.

b What is $P(.3 < Y_1 < .5)$? $P(.3 < Y_2 < .5)$?

Ignore the words "In Exercise 5.6,"

Problem 2

5.25 Let Y_1 and Y_2 have joint density function first encountered in Exercise 5.7:

$$f(y_1, y_2) = \begin{cases} e^{-(y_1+y_2)}, & y_1 > 0, y_2 > 0, \\ 0, & \text{elsewhere.} \end{cases}$$

a Find the marginal density functions for Y_1 and Y_2. Identify these densities as one of those studied in Chapter 4.

b What is $P(1 < Y_1 < 2.5)$? $P(1 < Y_2 < 2.5)$?

Problem 3

5.21 In Exercise 5.3, we determined that the joint probability distribution of Y_1, the number of married executives, and Y_2, the number of never-married executives, is given by

$$p(y_1, y_2) = \frac{\binom{4}{y_1}\binom{3}{y_2}\binom{2}{3 - y_1 - y_2}}{\binom{9}{3}}$$

where y_1 and y_2 are integers, $0 \leq y_1 \leq 3$, $0 \leq y_2 \leq 3$, and $1 \leq y_1 + y_2 \leq 3$.

a Find the marginal probability distribution of Y_1, the number of married executives among the three selected for promotion.

b Find $P(Y_1 = 1 | Y_2 = 2)$.

c If we let Y_3 denote the number of divorced executives among the three selected for promotion, then $Y_3 = 3 - Y_1 - Y_2$. Find $P(Y_3 = 1 | Y_2 = 1)$.

Ignore the words "In Exercise 5.3,"