

# STAT/MA 416 Fall 09 Section 002

## Homework 4

Due: September 25, 2009, 9:30am

Please show all your work, don't just write down the final number.

- Reading: Chapters 4.2, 5.1
- Exercises: 4.2.1, 4.2.5, 4.2.9, 4.2.11, 4.2.15, 5.1.3, 5.1.11, 5.1.13, 5.1.15, 5.1.21
- Exercises from Ross (7th ed)

3.62 Barbara and Dianne go target shooting. suppose that each of Barbara's shots hits the wooden duck target with probability  $p_1$ , while each shot of Dianne's hits it with probability  $p_2$ . Suppose that they shoot simultaneously at the same target. If the wooden duck is knocked over (indicating that it was hit), what is the probability that

- (a) both shots hit the duck;
- (b) Barbara's shot hit the duck?

Evaluate both quantities for  $p_1 = 0.7$  and  $p_2 = 0.6$ .

3.70 There is 50-50 chance that the queen carries the gene for hemophilia. If she is a carrier, then each prince has a 50-50 chance of having hemophilia. If the queen has had three princes without the disease, what is the probability the queen is a carrier? If there is a fourth prince, what is the probability that he will have hemophilia?

3.90 Suppose that  $n = 20$  independent trials, each of which results in any of the outcomes 0, 1, or 2 with respective probabilities  $p_0 = 0.5$ ,  $p_1 = 0.3$ , and  $p_2 = 0.2$ , are performed. Find the probability that outcomes 1 and 2 both occur at least ones.