Homework 4

MTH 3210 Probability and Statistics

Due Thu., Mar. 7

Unless stated otherwise, you must **show your work** to receive full credit.

Read These Sections of the Book	**Then Do These Problems**
3.1	Problem 1 (below), 2
3.2	12
3.3	32, 39
3.4	Problem 2 (below), Problem 3 (below), 48
3.5 (Just read about geometric rvs, pg 129)	Problem 4 (below), Problem 5 (below)

1. On a pass/fail exam, let

$$X = \begin{cases} 1 & \text{if you pass} \\ 0 & \text{if you fail} \end{cases}$$

   If you pass the exam with probability 0.8, what's the expected value and standard deviation of the random variable X?

2. What's the probability that two of the six employees at a company are not born in the fall? Assume that all seasons have the same probability of containing the birthday of a person selected randomly.

3. Suppose that each day the price of a stock moves up 1/8 of a point with probability 1/3 and moves down 1/8 of a point with probability 2/3. If the price fluctuations from one day to another are independent, what's the probability that after six days the stock has its original price?

4. The probability that a randomly selected box of a certain type of cereal has a particular prize is 0.2. Suppose you purchase box after box until you have obtained a prize. Let

   X = The number of boxes you purchase *up to and including* the first one containing a prize.

Determine the following.

(a) $P(X = 4)$.

(b) The expected value of X.

(c) The standard deviation of X.

5. Suppose each car entering a "T" intersection is equally likely to turn left or right. Starting at a fixed time, cars are observed until the first car is observed to turn left. Let

X = The number of cars *up to and including* the first one that turns left.

Determine the following.

(a) $P(X = 3)$.

(b) The expected value of X.

(c) The standard deviation of X.