HW #4

in the textbook, the material covered in this assignment is on pages 93-126...with some material in there that we have not covered

1. In a certain country, approximately 1 out of 2100 people have a certain characteristic. What is the probability that in a town of 3000 people, at least one person has that characteristic?

2. Suppose that the profit made on the sale of a necklace can be either $7, $9, $11, $13, $15, or $17 with respective probabilities 1/12, 1/12, 1/4 ,1/4, 1/6, and 1/6. What is the expected value of the profit here?

3. A coin is biased so that a head is three times as likely to occur as a tail. Find the expected number of tails when the coin is tossed twice.

4. In a gambling game a woman is paid $3 if she draws a Jack or a Queen and $5 if she draws a King or an Ace from an ordinary deck of 52 cards. If she draws any other card she does not win anything. How much should the woman pay to play the game if the game is to be a "fair" game? (A "fair" game is defined as a game with Expected Value = 0.)

5. Five percent of the disk controllers produced by a plant are known to be defective. A sample of fiteen controllers is drawn randomly from each month's very large production run and the number of defectives noted. What proportion of these monthly samples would have at least two defective controllers? (Hint: the proportion of the monthly samples with at least two defective controllers is the same thing as the probability that a particular month's sample has at least two defective controllers.....from the definition of probability as the long-run proportion of the time that an event occurs).

6. A company that produces fine crystal knows from experience that 10% of its goblets have cosmetic flaws and must be classified as "seconds".
      a) Among six randomly selected goblets, how likely is it that only one is a "second"?
      b) What is the expected value (mathematical expectation) of the number of "seconds" among six randomly selected goblets?
      c) Among six randomly selected goblets, what is the probability that at least two are "seconds"?
      d) If goblets are selected one by one, what is the probability that at most five must be selected in order to find four that are not "seconds"?

EXTRA CREDIT PROBLEM (worth 2 points) (if you submit a solution to this problem, please submit it on a separate piece of paper) please remember: all assignments, including this one, are to be done independently

A hamburger chain's game card has ten squares, each of which has a covering that can be rubbed off to reveal what is pictured beneath. Seven squares show different foods, two squares show the same food, and one square has an 'X-YOU LOSE' on it.
The game is played by rubbing the covering off the squares until either you get the pair and win, or you get the 'X' and lose.

What is the probability that you will win this game?