1. A fair quarter is flipped six times. What is:

    a. The probability of zero heads?

    b. The probability of 1 heads?

    c. The probability of 4 heads?

    d. The expected value of the number of heads? (Show a calculation to verify your answer.)

    e. The standard deviation of the number of heads? (Show a calculation to verify your answer).

2. A research team at Cornell University conducted a study that found that 10% of businessmen wear a tie so tight that it reduces blood flow to the brain (Source: *Chances: Risks and Odds in Everyday Life*, by James Burke). At a board meeting of 20 businessmen, what is:
    a. The probability that three men are wearing a tie that is too tight?

    b. The probability that less than five men are wearing a tie that is to tight?

    c. The expected number of men who are wearing a tie that is too tight? (Show a calculation to verify your answer).

    d. The standard deviation of the number of men who are wearing a tie that is too tight? (Show a calculation to verify your answer).

3. The percentage of men in a heterosexual marriage who say that they would marry the same woman again if they had to do it all over again is 80% (Source: *Harper's Index*). If we randomly sampled 25 men in heterosexual marriages, what is:

   a. The probability that all 25 would say that they would marry the same woman again if they had it to do over?

   b. The probability that 20 would say that they would marry the same woman again if they had it to do over?

   c. The probability that fewer than 5 men would say that they would marry the same woman again if they had it to do over?

   d. The mean (i.e., expected) number of men who would say that would marry the same woman again if they had it to do over? (Show a calculation to verify your answer).

   e. The standard deviation of the number of men who would say that would marry the same woman again if they had it to do over? (Show a calculation to verify your answer).

4. Wade Boggs is a Hall of Fame baseball player who batted 0.328 for his career—that is, he got a hit in approximately 32.8% of at-bats. Suppose we took a random sample of 5 at-bats from Boggs' career and counted the number of hits he got in those at-bats.

   a. What is the sample space of this binomial random variable?

   b. For each outcome in the sample space, list its probability (this is similar to the questions asked on the 5.1 HW).

c. Sketch a relative frequency histogram of for this binomial distribution.

d. What is the mean (i.e., expected) number of hits that we will observe in these 5 at-bats? (Show a calculation to verify your answer).

e. What is the standard deviation of the number of hist that we will observe in these 5 at-bats? (Show a calculation to verify your answer).