PROBLEM 1: In a study reported in Chapter 5 of the textbook, researchers were able to get information about voting behavior of a sample of registered voters. They knew whether or not these people voted in the November 1986 election. Seven months after the election, they surveyed these people and asked them whether or not they had voted in that election. Of those who actually *had* voted, 96% said that they did and 4% said they did not. Of those who had *not* voted, 40% claimed that they did vote and 60% admitted that they did not. Suppose these people are representative of the population of registered voters, and that in fact 50% of the population actually voted in the election.

Use the following abbreviations for events for a randomly selected person from this population:
V = voted, V^C = didn't vote
S = said they voted, S^C = said they did not vote

Given that someone said they voted, what is the probability that they actually did vote? In other words, find P(V | S)

PROBLEM 2: Based on the 2000 Census, 52% (p = .52) of the California population aged 15 years old or older are married. Suppose n = 1000 persons are to be sampled from this population and the sample proportion of married persons ($\hat{p}$) is to be calculated.

1. What is the mean of the sampling distribution of $\hat{p}$?
2. What is the standard deviation of the sampling distribution of $\hat{p}$?
3. Draw a picture of the sampling distribution of $\hat{p}$. Identify the values that have the middle 68% of the distribution between them.
4. Find the probability that less than 50% of the sample will be married. (If you don't have a table, software or calculator, then leave this in the form of a probability with a z-score.)

PROBLEM 3: The speeds of cars at a certain location on an interstate highway are approximately normal with μ = 67 miles per hour and σ= 6 miles per hour. When the highway patrol is looking for speed violators, they will stop cars going over 75 miles per hour.

1. What proportion of cars are going over 75 miles per hour?
2. The speed limit is 65 miles per hour. What proportion of cars are going at or under the speed limit?
3. If three cars are randomly selected at different times, what is the probability that they are all going over 67 mph?

PROBLEM 4: There are 2000 tickets sold for a raffle. Three winning tickets are chosen and those ticket holders each win $400. Define the random variable X = amount won by purchasing one ticket.

1. Write the pdf for X.
2. Find E(X) = the expected value of X. Show your work.
3. If you buy 2 tickets, what is the probability that you win for *both tickets*?