Name:

Elementary Statistics HW 4.5

1. What is conditional probability?

2. Let event A = the subject is telling the truth
   and event B = a polygraph test indicates that the subject is lying

   a. Use your own words to translate the notation *P(B|A)* into a verbal statement.

   b. Describe the confusion of the inverse using the events *A* and *B*.

3. Event C: When a couple has five children, none of the five is a girl.
   (Assume that boys and girls are equally likely).

   a. Describe the complement of event C.

   b. Find the probability of the complement of event C.

4. Event D: When four digits (between 0 and 9 inclusive) are randomly selected with replacement for a lottery ticket, at least one of the digits is a 5.

   a. Describe the complement of event D.

   b. Find the probability of the complement of event D.

5. From past experience, a statistics student estimates that there is a 0.92 probability that her TI-84+ graphing calculator will work on any given day. Because the final exam is so important, she plans to bring in two of the same type of graphing calculators.

    a. What is the probability that she will be able to complete her exam with at least one working calculator?

    b. Does she really gain much by bringing in the backup calculator? Explain.

6. If you make random guesses for 10 multiple-choice test questions (each with 5 possible answers), what is the probability of getting at least one answer correct, given that the first 9 answers are all wrong?

7. According to FBI data, 12.4% of burglaries are cleared with arrests. A new detective is assigned to 5 different burglaries.

    a. What is the probability that at least one of them is cleared with an arrest?

    b. What is the probability that the new detective clears all 5 burglaries with arrests?

    c. What could we conclude if the new detective clears all 5 burglaries with arrests?

8. Identical twins come from a single egg that splits into two embryos. Fraternal twins are from separate fertilized eggs. The table below reflects the principle that among sets of twins, 1/3 are identical and 2/3 are fraternal. Also, identical twins must have the same gender and the genders are equally likely. The genders of fraternal twins are equally likely.

	Boy/Boy	**Boy/Girl**	**Girl/Boy**	**Girl/Girl**
Identical Twins	**5**	**0**	**0**	**5**
Fraternal Twins	**5**	**5**	**5**	**5**

a. After having a sonogram, a pregnant woman learns that she will have twins. What is the probability that she will have fraternal twins?

b. After studying the sonogram more closely, the doctor tells the pregnant woman that she will give birth to twins consisting of one boy and one girl. What is the probability that she will have fraternal twins?

c. If a pregnant woman is told that she will give birth to fraternal twins, what is the probability that she will give birth to two girls?