STAT 205, Spring 2015

Homework 2

Out: Thursday January 29. Due in: Thursday February 5.

1. (**Round all numbers to three decimal places**) In a study of the effects of smoking, 9793 pregnant women were asked about their smoking habits. The following classifies each by whether their infant was low birthweight (less than 2500 grams) or normal birthweight, and whether they smoked:

	Smoker	Nonsmoker	Total
Low Birthweight	237	197	434
Normal Birthweight	3489	5870	9359
Total	3726	6067	9793

   If a woman is selected at random from this study:

   (a) What is the probability that the woman smokes?

   (b) What is the probability of the woman having a low birthweight infant?

   (c) Given that a woman smokes, what is the probability she has a low birthweight infant?

   (d) Is smoking independent of birthweight? Why or why not?

2. (**Round all numbers to five decimal places**) At a sexually transmitted disease (STD) clinic in Miami, Florida, patients were screened for hepatitis C using Centers for Disease Control and Prevention (CDC) screening criteria in the form of a questionnaire (Weisbord et al., 2003). The study concluded that the probability of having Hepatitis C is $Pr(disease) = 0.047$, the probability that the test comes up positive for those that have Hepatitis C (sensitivity) is 0.61 and the probability it comes up negative for those that do not have Hepatitis C (specificity) is 0.91.

   (a) Draw a probability tree for this situation.

   (b) Find the probability that the test comes up positive.

   (c) Given that the test comes up positive, find the probability of having Hepatitis C.