STAT 251  Statistical Inference for Management I  Winter 2015

Quiz 10: Conditional Probability, Independence

Assigned on Wed Jan 28; due on Mon Feb 2. You may work with a group of as many as 4 students, submitting one quiz with all names, provided that you all contribute to the work. You may use your notes.

Suppose that you encounter two traffic lights on your commute to school. Based on past experience, you judge that the probability is .35 that the first light will be red when you get to it, .45 that the second light will be red, and .20 that both lights will be red. Let $R_1$ denote the event that the first light is red, and let $R_2$ denote the event that the second light is red.

1) Determine the probability that at least one light will be red. (Show how you calculate this.)

2) Determine the conditional probability that the second light will be red given that the first light is red. (Show how you calculate this.)

3) Are the events $R_1$ and $R_2$ independent? Justify your answer numerically.

4) Are the events $R_1$ and $R_2$ disjoint (mutually exclusive)? Justify your answer numerically.

5) Determine the conditional probability that the second light will not be red, given that the first light is not red. (Show how you calculate this.)