

## STAT 251 Statistical Inference for Management I Winter 2012

### Quiz 13

Assigned on Mon Feb 6; due on Tues Feb 7. You may work with *one* partner, submitting one quiz with both names, provided that you both 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 .5 that the first light will be red when you get to it, .4 that the second light will be red, and .3 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.)