

MIT OpenCourseWare  
<http://ocw.mit.edu>

1.010 Uncertainty in Engineering  
Fall 2008

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.

**1.010 –Mini-Quiz #1**  
(30 min – open books and notes)

**Problem 1 (30 points)**

Events A and B have probability  $P[A] = P[B] = 0.25$ .

Given that A and B are mutually exclusive:

- a) Can you find  $P[A \cup B]$ ?
- b) Can you find  $P[A \cap B]$ ?

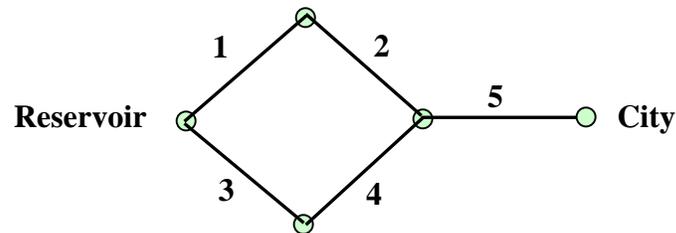
Given that A and B are independent:

- a) Can you find  $P[A \cup B]$ ?
- b) Can you find  $P[A^c | B]$ ?

If your answer to any of the above questions is ‘yes’, then give its numerical value. If it is ‘no’, then briefly explain why.

**Problem 2 (30 points)**

The aqueduct from a reservoir to a city has the configuration shown below. If a large earthquake occurs, each of the five links of the aqueduct has a probability 0.3 of failing.



Assuming that failures of different links are independent events, find the probability that the water supply to the city is not interrupted by the earthquake.

***Problem 3 (40 points)***

You left your cell phone either in the computer lab or in the cafeteria. You think that with probability 0.6 it happened in the computer lab, because you always take it out of your pocket there. With probability 0.4 it happened in the cafeteria. If you left the phone in the computer lab, there is a probability 0.3 that someone stole it. In the cafeteria, that probability is 0.6.

(a) What is the probability that you will find your cell phone? (either in the lab or in the cafeteria)

(b) Given that you found the cell phone, what is the probability that you left it in the cafeteria?