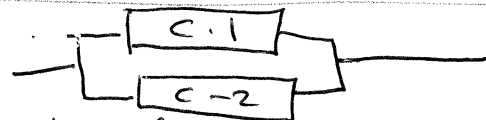


1. A state has three regions: The City, The Suburbs and Downstate. These have, respectively, 40%, 35% and 25% of the voters. On a given initiative, these regions support Proposition A by 60%, 35% and 50% respectively. Thus, for example, 25% of the voters are Downstate and 50% of them support Proposition A.

Math 461  
HW4  
Due 9/25/09

- (a) What proportion of the voters in the state support Proposition A?  
 (b) What is the probability that a voter who supports Proposition A lives in the City?  
 (c) What is the probability that a voter who does not support Proposition A lives in the City?

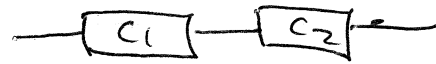
2. A parallel circuit is given



The probability that component 1 works all year is .9  
 The probability that component 2 works all year is .8  
 The probability that the circuit works all year is .96

(a) What is  $P(\text{comp 2 fails} \mid \text{comp 1 fails})$ ?

(b) Using the same components and their relative successes, an engineer builds a series circuit



What is the probability it works all year? DO NOT ASSUME

DO NOT ASSUME INDEPENDENCE IN ANY OF THESE PROBLEMS

3 (a) Suppose  $P(A|B) = \frac{1}{3}$ ,  $P(B|A) = \frac{1}{4}$  and  $P(A^c \cap B^c) = \frac{1}{5}$

Determine  $P(A)$ ,  $P(B)$ ,  $P(A \cap B)$  and  $P(A \cup B)$

Hint: a diagram will help

(b) Make up a story to go with the data in (a)

The very best story will get  $\frac{1}{2}$  of extra credit!