

Mathematics 375 – Probability and Statistics 1  
Discussion 2 – The “Event-Composition Method”  
September 17, 2009

*Background*

The idea of the event-composition method is to recognize that the event of interest  $E$  can be defined using some combination of unions, intersections, or complements of other known events. Then apply the additive and multiplicative laws of probability:

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

and

$$P(A \cap B) = P(A)P(B|A) = P(B)P(A|B)$$

to find  $P(E)$  from the other given information.

*Discussion Questions*

A) Given:  $P(A) = .2$ ,  $P(B) = .3$ ,  $P(A \cup B) = .4$ . Determine:

- 1)  $P(\overline{A} \cup \overline{B})$ .
- 2)  $P(\overline{A}|B)$ .

B) The circles marked 1,2,3,4 in the following diagrams represent electrical relays that operate independently and function properly with probability  $p = .85$ .

Which design yields the higher probability that current will flow when the relays are activated?

C) An accident victim will die unless he receives type  $A+$  blood before 10 minutes elapse. He will be saved if he does get the blood transfusion. Potential donors and a reusable blood typing kit are available, but it takes 2 minutes to determine each donor's blood type, and only 40% of them have type  $A+$  blood. What is the probability that the victim will be saved if only one donor's blood can be typed at a time?

*Assignment*

Group writeups due Monday, September 21.