Name:

ECEn 370

Quiz 1 Solutions

Friday, January 8, 2009.

1. I have the sets A, B, C which are events formed from a sample space, Ω. Which of the following statements are *always* true?

a) $A \cup (A \cap B) = A \cap (A \cup B)$
True. We can see that $A \cup (A \cap B) = A = A \cap (A \cup B)$

b) $A \cap A^c = \emptyset$
True.

c) $(A \cap B)^c = A^c \cup B$
False. The true expression of DeMorgan's yields $(A \cap B)^c = A^c \cup B^c$.

d) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
True. This is the distributive law.

e) $A^c = \emptyset$.
False. This is only true if $A = \Omega$.

2. Suppose I have a coin that when flipped gives me a head, H, or tail, T, with no other possibilities (lands on edge, falling into a black hole, gravity reverses,...). The coin is biased, however, and tends to fall with more probability on the head side than the tail. My experiment is to flip this coin once and observe the outcome.

a) What is my sample space for this experiment, Ω?
{H, T}

b) What are the possible events for this experiment?
$\emptyset$, {H}, {T}, Ω ={H,T}

c) What is the probability of the event that I get neither a head nor a tail?
P($\emptyset$) = 0.