

## Thought Questions for Lecture on Friday, November 6th

1. What is wrong with the following statement?  
*“The probability that you will die from a bee sting is about 15 times higher than the probability that you will die from a shark attack.”*
2. Do you think it is *likely* that anyone will ever *win the multi-million dollar state lottery twice* in a lifetime?
3. *You test positive for a rare disease* for which your original chances of having disease are 1 in 1000. The test has a 10% false positive rate and a 10% false negative rate => *whether you have the disease or not, the test is 90% likely to give a correct answer.* Given you tested positive, what do you think is the *probability that you actually have disease*? Higher or lower than 50%? In other words, we know  $P(\text{pos. test} \mid \text{disease})$  and want  $P(\text{disease} \mid \text{pos. test})$
4. If you were to flip a fair coin six times, which sequence do you think would be most likely: HHHHHH or HHTHTH or HHHTTT?
5. Which one would you choose in each set? (Choose either A or B and either C or D.) Explain your answer
  - A. A gift of \$240, guaranteed
  - B. A 25% chance to win \$1000 and a 75% chance of getting nothing.
  - C. A sure loss of \$740
  - D. A 75% chance to lose \$1000 and a 25% chance to lose nothing
6. Which do you think caused more deaths in the United States in 2005 (latest year for which data are available), homicide or diabetes? What do you think the ratio was?
7. At the height of the Cold War with Russia, Plous (1993) presented readers with the following test:  
Place a check mark beside the alternative that **seems most likely to occur within the next 10 years**:
  - An all-out nuclear war between the United States and Russia
  - An all-out nuclear war between the United States and Russia in which neither country intends to use nuclear weapons, but both sides are drawn into the conflict by the actions of a country such as Iraq, Libya, Israel, or Pakistan.Using your intuition, pick the more likely event at that time.
8. A fraternity consists of 30% freshmen and sophomores and 70% juniors and seniors. ***Bill is a member of the fraternity, he studies hard, he is well-liked by his fellow fraternity members, and he will probably be quite successful when he graduates.*** Is there any way to tell if Bill is **more likely** to be a lower classman (freshman or sophomore) or an upper classman (junior or senior)?