

Monday, January 26

Required Reading

- Wade, *Blaise Pascal: An Apologist for Our Time*
- *Pascal's Wager*

Other Preparation

Do these problems on a *separate sheet of paper*.

1. We said in class that the margin of error depends on the sample size. This problem investigates this statement in more detail.
 - a) Recall that the margin of error also depends on the sample proportion (\hat{p}). The worst case (i.e. largest margin of error) occurs when the proportion is 0.5, so assume that situation and work out the margin of error for each of the sample sizes below.

sample size (n)	margin of error		
	sample prop. = 0.5	sample prop. = 0.3	sample prop. = 0.1
100			
400			
1600			
6400			

- b) Add columns in your chart for the margin of error assuming a sample proportion of 0.3 and 0.1.
 - c) What do you notice when you look at the completed table?
2. Consider the following silly game. You roll a 6-sided die. If you roll a 6, you get \$6. If you roll a 5 you get \$5. Otherwise you win nothing. What is the expected value of this game?
3. A Roulette wheel has 18 red, 18 black and 2 green slots. If you bet \$1 on green, what is the most the casino can afford to pay you if they want to come out ahead? Round in the casino's favor to the nearest dollar. What is the expected value of a \$1 bet on green given this payout.
4. Keno is another lottery game. In this game, the player chooses 10 different numbers between 1 and 80. Later the lottery commission selects 22 numbers. Tickets cost \$1 and prizes are determined based on the number of matches:

Matches	prize	probability
0	\$1 (free lottery ticket)	3840963/121199272
1	\$0	4311285/30299818
2	\$0	162966573/605996360
3	\$0	4260564/15149909
4	\$0	141663753/787795268
5	\$0	72168327/984744085
6	\$7	15146439/787795268
7	\$25	3147312/984744085
8	\$250	252909/787795268
9	\$2,500	3451/196948817
10	\$250,000	119/302998180