

Stat 185 - Review problems for Exam 1

First Draft

Our second exam is next Wednesday, October 25. Here are a few problems to get you thinking. There's a good chance that *most* or even all of these problems will be represented on the exam. There might be one or two more, as well.

1. I've got an unfair coin that comes up heads 75% of the time. Suppose I flip that coin 12 times and count the number of heads. Use n choose k notation to express the probability that I get exactly 10 heads.
2. According to the UNCA Factbook, of the 666 students enrolled as Freshmen in the Fall of 2016, 416 were women and 250 were men. If we randomly select 10 of those new students, what is the probability that exactly 4 of them will be men?
3. (a) Suppose I roll one fair, seven-sided die.
What is the probability that I roll a 7 or an 8?
(b) Suppose I roll two fair, seven-sided die.
What is the probability that I roll a 7 and an 8?
4. Consider a random variable X with the following distribution:

X	-2	3	5
$P(X)$	0.2	0.3	0.5

- (a) Write down the specific formula to compute $E(X)$.
 - (b) Write down the specific formula to evaluate $\sigma(X)$.
5. Suppose that 10% of all people are left handed. Use a normal distribution to estimate the probability that more than 15 people of a random sample of 200 will be left handed.
 6. Suppose that, on average, the typical Stat 185 can make \$625 in a Summer job, with a standard deviation of \$142.
 - (a) How much money would all 64 students enrolled in my Stat 185 classes *expect* to make combined?
 - (b) What's the probability that, collectively, all 64 make more than \$55000 over the Summer

7. In a random sample of 432 North Carolinians, I find that 85 of them smoke.
- (a) What is the standard error associated with this measurement?
 - (b) Write down a 95% confidence interval for the proportion of North Carolinians that smoke based on this data.
8. It is believed that nearsightedness affects about 8% of all children. In a random sample of 194 children, 21 are nearsighted.
- (a) Construct hypotheses appropriate for the following question: do these data provide evidence that the 8% value is inaccurate?
 - (b) What proportion of children in this sample are nearsighted?
 - (c) Show that the standard error of the sample proportion is 0.0195.
 - (d) What is the p-value for this hypothesis test? (Use R and/or a Z-score.)
 - (e) What is the conclusion of the hypothesis test?