

Statistics 2 - Summer 2009 - Practice Final questions

1. You have a well-shuffled deck of cards, and deal the first five cards face up. What is the probability you have four of a kind?
2. A die will be rolled some number of times. You'll win \$100 if the proportion of sixes is between 16% and 18%. Which would you prefer, 60 rolls or 600 rolls? Why?
3. A die will be rolled some number of times. You'll win \$100 if the proportion of sixes is exactly $1/6$. Which would you prefer, 60 rolls or 600 rolls? Why?
4. 100 draws will be made at random with replacement from a box containing $[-10 -5 0 1 3 7 9]$. What is the expected value and standard error of the sum of the draws?
5. Consider the box described in question 4. You make 400 draws at random with replacement, and count the number of times a negative number is drawn. What is the expected value and standard error of the count?
6. A fair coin is flipped 6 times. What is the approximate chance you get 4 or more heads?
7. A box contains red, white, and blue balls, but you don't know how many of each there are. You make 25 draws at random with replacement and get 15 red balls, 9 blue balls, and 1 white ball. Now say you're going to make 100 draws, also at random with replacement. What are the expected value and standard error for the number of blue balls you get?
8. Once again, consider the box with an unknown number of red, white, and blue balls. You make 25 draws at random with replacement and get 15 red balls, 9 blue balls, and 1 white ball. If possible, construct a 95% confidence interval for the proportion of white balls in the box. If it's not possible, explain why not.
9. Someone claims that the box in problem 8 actually contains 50% red balls, 45% blue balls, and 5% white balls. Do you believe them? Conduct an appropriate hypothesis test, if possible, to test the theory. If it's not possible, explain why not.
10. An organization wants to know if voters are for or against repealing Proposition 13 in California. A survey is conducted in the following way: All the counties are divided by population (small or large). Some small and some large counties are picked at random, and then certain zip codes are picked at random inside each selected county. Finally, a simple random sample of voters in the selected zip codes are taken. The number of people surveyed totals 900. It is found that 37% of those surveyed support the repeal of Proposition 13. True or false, and explain: You'd estimate the percentage of the population who support the repeal of Proposition 13 to be 37% with a standard error of 1.6%.
11. A host on a television show, known for his tough stance on illegal immigration, asks listeners to call in and say whether they think illegal immigrants should be deported immediately, without a court appearance. 93% of callers say they should. Is 93% a good estimate of the opinion of all Americans? Why or why not?
12. An organization wants to know if voters are for or against repealing Proposition 13 in California. A simple random survey of 900 voters is taken, and 37% are in favor of repealing Proposition

13. True or false, and explain: You'd estimate the percentage of all voters who support the repeal of Proposition 13 to be 37%, give or take 1.6%.

13. You have a well-shuffled deck of cards, and deal the first 13 cards off the top. What is the approximate probability of getting 5 or more spades?

14. You roll a die 60 times, and get 15 fours. Is the die fair, or are there too many fours?

15. You roll a die 60 times, and get 9 ones, 8 twos, 9 threes, 15 fours, 10 fives, and 9 sixes. Is the die fair? Construct an appropriate hypothesis test.