

## Quiz 3

March 6

Your section: \_\_\_\_\_ Print your name: \_\_\_\_\_

Sign your name: \_\_\_\_\_

This is an open book exam. However, you are not allowed to pass any material (such as books, notes, or calculators) to each other. The quiz consists of four problems each carrying 8 points but the maximum you can score is 25. You have 40 minutes. Good luck!

**Problem 1.** A fair coin is thrown 1000 times.

- (i) Find the chance that the number of heads is between 490 and 520.
- (ii) Find the chance that the percentage of tails is between 48% and 51%.

(4+4 = 8 points)



**Problem 2.** Six hundred draws will be made at random with replacement from the box  $[-1, 0, 1]$ . The sum of the numbers in the draws that are less than 1 will be around (a), give or take (b) or so. Find appropriate numbers for (a) and (b). Hence compute the chance that the sum of the numbers in the draws that are less than 1 is between -220 and -180.

(8 points)

**Problem 3.** A survey research company has a contract to estimate the percentage of people listening to Spanish-language radio programs in several Southwestern cities. They are using a simple random sample of size 1,000 in Austin, Texas, which has about 500,000 residents. And they are satisfied with the accuracy of the estimates for Austin.

Dallas has about twice the population of Austin, but similar demographics. Decide whether the following statement is true or false, and explain: *to get about the same accuracy in Dallas as in Austin, the company should use a simple random sample of size 2,000.*

( 8 points)

**Problem 4.** Ten thousand draws are made at random from a box with 99 tickets marked 0 and 1 ticket marked 1. True or false and explain:

- (i) The sum will be around 100, give or take 10 or so.
- (ii) There is about a 68 % chance that the sum will be in the range 90 to 110.