

Homework 12 Chapter 20 (Problems 1 to 7)

Due on April 25

Math 125 Kovitz Spring 2025

1. You are drawing from a large box of red and blue marbles. Fill in the blanks.
 - (a) The expected value for the percentage of reds in the _____ equals the percentage of reds in the _____.
Options: sample, population.
 - (b) As the number of draws goes up, the SE for the _____ of reds in the sample goes up but the SE for the _____ of reds goes down.
Options: number, percentage.

2. In a certain city, there are 300,000 registered voters, of whom 30,000 are Democrats. A survey organization is about to take a simple random sample of 2,500 registered voters.
 - (a) The expected value for the percentage of Democrats in the sample is _____. The SE for the percentage of Democrats in the sample is _____.
 - (b) The percentage of Democrats in the sample is likely to be around _____, give or take _____ or so.
 - (c) Find the chance that between 9% and 11% of the registered voters in the sample are Democrats.

3. Four hundred draws are made at random from the box

$$\boxed{40,000 \text{ } \boxed{0} \text{'s} \quad 10,000 \text{ } \boxed{1} \text{'s}}$$

True or false, and explain.

- (a) The expected value for the percentage of 1's among the draws is exactly 20%.
 - (b) The expected value for the percentage of 1's among the draws is around 20%, give or take 2% or so.
 - (c) The percentage of 1's among the draws will be around 20%, give or take 2% or so.
 - (d) The percentage of 1's among the draws will be exactly 20%.
 - (e) The percentage of 1's in the box is exactly 20%.
 - (f) The percentage of 1's in the box is around 20%, give or take 2% or so.
4. At a large university, 73.2% of the students are female and 26.8% of the students are male. A simple random sample of 1,000 persons is drawn from this population. The SE for the sample percentage of females is figured as 1.4%.
True or false: There is about a 95% chance for the percentage of females in the sample to be in the range $73.2\% \pm 2.8\%$. Explain.
 5. True or false: with a well-designed sample survey, the sample percentage is very likely to equal the population percentage.

6. A simple random sample is drawn _____ replacement.

Options: with without.

7. A polling organization takes a simple random sample of 625 students from a college with 25,000 students. In the sample, 325 students are for the proposal. Fill in the blanks, using the options below. Explain briefly.

- (a) The observed value of the _____ is 325.
- (b) The observed value of the _____ is 52%.
- (c) The expected value of the _____ is equal to the _____.

Options:

- (i) number of students in the sample who are for the proposal
- (ii) percentage of students in the sample who are for the proposal
- (iii) percentage of students in the college who are for the proposal