Homework 14 Chapter 23 (Problems 1 to 6)

Due on April 30

Math 125 *Kovitz* Spring 2025

1. You are drawing at random with replacement from a box of numbered tickets. Fill in the blanks.

   (a) The expected value for the average of the _____ equals the average of the _____. *Options:* box, draws.

   (b) As the number of draws goes up, this SE for the _____ of the draws goes up but the SE for the _____ of the draws goes down. *Options:* sum, average.

2. A university has 30,000 registered students. As part of a survey, 900 of these students were chosen at random. The average age of the sample students turns out to be 22.3 and the SD is 4.5 years.

   (a) The average age of all 30,000 students is estimated as _____. This estimate is likely to be off by _____ or so.

   (b) Find a 95%-confidence interval for the average age of all 30,000 registered students.

3. A cable company takes a simple random sample of 350 households from a city with 37,000 households. In all, the 350 sample households had 637 TV sets. Fill in the blanks, using the options below.

   (a) The observed value of the _____ is 637.

   (b) The observed value of the _____ is 1.82.

   (c) The expected value of the _____ is equal to the _____.

   Options:

   (i) total number of TV sets in the sample households.

   (ii) average number of TV sets per household in the sample.

   (iii) average number of TV sets per household in the city.

Problems 4 to 6 are on the next page.

4. Fill in the table below, for draws made at random with replacement from the box

0	2	3	4	6

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Number of draws	*EV for sum of draws*	*SE for sum of draws*	*EV for average of draws*	*SE for average of draws*
25				
100				
400				

5. In a certain city, there are 10,000 men age 25–34; 225 of them are choseen at random:

$$\text{average of sample incomes} = \$24{,}200$$
$$\text{SD of sample incomes} = \$17{,}700$$

   (a) Estimate the average income of all men in the city with ages in the range 25–34.

   (b) Attach an SE to your estimate.

   (c) True or false, and explain: About 95% of the men age 25–34 in the city have incomes in the range from \$21,840 to \$26,560.

6. There are about 2,700 institutions of higher learning in the United States (including junior colleges and community colleges). In 1976, as part of a continuing study of higher education, the Carnegie Commission took a simple random sample of 225 of these institutions. The average enrollment in the 225 sample schools was 3,700, with an SD of 6,000. A histogram for the enrollments was plotted and did not follow the normal curve. However, the average enrollment of all the 2,700 institutions was estimated to be around 3,700, give or take 400 or so. Say whether each of the following statements is true or false, and explain why.

   (a) It is estimated that 95% of the institutions of higher learning in the United States enroll between $3{,}700 - 800 = 2{,}900$ and $3{,}700 + 800 = 4{,}500$ students.

   (b) An approximate 95%-confidence interval for the average enrollment of all 2,700 institutions runs from 2,900 to 4,500.