Practice for Test 3, Math 125

(The test will be on Monday, May 12) Math 125 Kovitz Spring 2025

On the test, show your work. The test will consist of 5 similar questions, each worth 21 points.

 A simple random sample of 1,500 persons is taken to estimate the percentage of Democrats in a large population. It turns out that 1107 of the people in the sample are Democrats. Find a 95%-confidence interval for the population percentage.

(A) 70.394% to 77.206% (B) 71.53% to 76.07% (C) 72.655% to 74.935% (D) 72.761% to 74.839% (E) 73.787% to 73.913%

2. The tickets in a box average 50, with an SD of 8. Twenty-five draws will be made at random with replacement from this box.

Estimate the chance that the average of the draws will be in the range 46 to 54.

(A) 3.985% (B) 7.97% (C) 19.145% (D) 38.29% (E) 98.76%

3. A survey organization wants to take a simple random sample in order to estimate the percentage of people who have seen a certain television program. To keep the costs down, they want to take as small a sample as possible. But their client will only tolerate chance errors of 2 percentage points or less in the sample. Should they use a sample of size 25, 625, 2,500, 10,000, or 40,000? Assume that the population is very large.

What size sample should they use?

(A) 25 (B) 625 (C) 2,500 (D) 10,000 (E) 40,000

4. Twenty-five measurements are made on the speed of light. These average out to 300,007 and the SD is 10, the units being kilometers per second. (You may assume the Gauss model, with no bias.)

Only one of the following five statements is false. Which one?

- (A) The speed of light is estimated as 300,007.
- (B) The above estimate is likely to be off by 2 or so.
- (C) Each measurement is off 300,007 by 10 or so.
- (D) If a 26th measurement were made, it would by off the exact value for the speed of light by 2 or so.
- (E) A 99.7%-confidence interval for the speed of light is $300,007 \pm 6$.
- 5. A die is rolled 4800 times, resulting in 761 $\overline{}$'s.

Does the result indicate that the die is fair, or that it gets too few 's?

(Use a statistical test to decide, and state the value of P and your conclusion.)

(A) P = 0.0026%, unfair (B) P = 3.5%, unfair (C) P = 7%, fair (D) P = 14%, fair (E) P = 43%, fair