Test 3

(December 10)

Name _____

Math 125 *Kovitz* Fall 2025

Each question is worth 21 points.

1. Chicago has 2,000,000 people. The average income is $52,200, with an SD of $19,600. The distribution is not normal, however, since 5% of the people earn over $100,000..

   If one draws a simple random sample of 1600 people from the 2,000,000, what is the chance (approximately) that somewhere between 4% and 6% of the people in the sample will earn over $100,000? (Any correction factors may be ignored.)

   (A) about 4%   (B) about 8%   (C) about 12%   (D) about 20%   (E) about 40%

2. (a) Probabilities are used when reasoning from the _____ to the _____;

   confidence levels are used when reasoning from the _____ to the _____.

      Options: box   draws

   (b) The chance error is in the _____ value.

      Options: observed   expected.

   (c) The confidence interval is for the _____ percentage.

      Options: sample   population

Turn over for problems 3 to 5.

3. One hundred draws will be made at random with replacement from the box

$\boxed{1}$ $\boxed{2}$ $\boxed{3}$ $\boxed{4}$ $\boxed{5}$ $\boxed{6}$ $\boxed{7}$.

Estimate the chance that the average of the draws will be more than 4.2.

(A) 1%   (B) 16%   (C) 31%   (D) 68%   (E) 84%

4. The speed of light was measured 2,500 times. The average reading was 299,787 kilometers per second, and the SD was 11.5 kilometers per second. Assume the Gauss model, with no bias. Find a 95%-confidence interval for the speed of light.

(A) 299,786.99 to 299,787.01   (B) 299,786.77 to 299,787.23   (C) 299,786.54 to 299,787.46
(D) 299,774.7 to 299,799.3   (E) 299,764 to 299,810

5. A coin is tossed 6400 times, resulting in 3300 heads. Someone tells you that it is a fair coin.

Use the sample data to assess whether or not this claim is credible and indicate your conclusion below.

Clearly choose your null and alternative hypotheses, set up a box model, and run a test of hypotheses. You should base your conclusion on the results of that test. Decide whether the claim is credible or not credible.

Answer with the value of P and the decision.

(A) $P = 1\%$, not credible   (B) $P = 1\%$, credible   (C) $P = 11\%$, credible
(D) $P = 21\%$, credible   (E) $P = 31\%$, credible