

Homework 16 Chapter 26 (Problems 1 to 8)

Due on May 9

Math 125 Kovitz Spring 2025

1. In order to test a null hypothesis, you need
 - (i) data
 - (ii) a box model for the data
 - (iii) both of the above
 - (iv) none of the above
2. The _____ hypothesis says that the difference is due to chance but the _____ hypothesis says that the difference is real.

Fill in the blanks. Options: null, alternative.
3. True or false, and explain.
 - (a) If P is 43%, the null hypothesis looks plausible.
 - (b) If P is 0.43 of 1%, the null hypothesis looks implausible.
 - (c) The alternative hypothesis is another way of explaining the results; it says the difference is due to chance.
4. According to one investigator's model, the data are like 110 draws made at random from a large box. The null hypothesis says that the average of the box equals 50. The alternative says that the average of the box is more than 50. In fact, the data averaged out to 53.6, and the SD was 25. Compute z and P .

State the value of P and the conclusion.
 - (A) $P = 1.51\%$, equals 50
 - (B) $P = 1.51\%$, more than 50
 - (C) $P = 2.28\%$, more than 50
 - (D) $P = 7\%$, equals 50
 - (E) $P = 14\%$, equals 50
5. National surveys say that on average, college freshmen spend 7.5 hours a week going to parties. One administrator does not believe that these figures apply at her college, which has nearly 3,000 freshmen. She takes a simple random sample of 100 freshmen, and interviews them. On average, they report 5 hours a week going to parties, and the SD is 9 hours. Is the difference between 5 and 7.5 real?
 - (a) Formulate the null and alternative hypotheses in terms of a box model.
 - (b) Fill in the blanks.
The null says that the average of the box is _____.
The alternative says that the average of the the box is _____.
(c) Now answer the question: is the difference real?
6. A die is rolled 18,000 times.
 - (a) Someone figures the expected number of fours as $18,000 \times 1/6 = 3,000$, and the SE as $\sqrt{18,000} \times \sqrt{1/6 \times 5/6} = 50$.
Is this right? Answer yes or no, and explain.
 - (b) The 18,000 rolls resulted in 3,120 fours.
Does this die appear to be fair?
(Decide which test applies, show all calculations, and state the decision.)
7. A coin was tossed 150 times and got 90 heads.
Find P and decide if the coin is fair or gets too many heads.
8. Other things being equal, which is stronger evidence for the null hypothesis: $P = 3\%$ or $P = 27\%$?