Warmup

A. Problem Statement

We would like to test the following hypotheses:

$$H_0: \mu = 3$$
$$H_A: \mu \neq 3,$$

Where:

- μ is the average number of UIUC games that ALL former STAT107 students have seen

In order to test this, we need to know more about the sampling distribution of

(1)_________________________.

B. Random Sample

To conduct this hypothesis test, we collect a random sample of 40 former STAT107 students that has a mean number of games of 6 and a standard deviation of 2.

***C. Actual* Sampling Distribution Creation**

If we wanted to create this sampling distribution by hand, that would help us test these hypotheses we would need to do the following.

1. Collect M random samples of size n=40, (2)______________ (WITH/WITHOUT)replacement from the population of all former STAT107 students.
2. Then calculate the (3)__________________ of each of these random samples and put them in a list.

D. Theoretical Sampling Distribution

HOWEVER, we don't actually need to create this sampling distribution above, because we know the following things about this sampling distribution.

1. The mean of this sampling distribution is approximately (4)______________________________.
2. The standard deviation of this sampling distribution (aka the standard error) is approximately (5)_________________________.
3. Because the following (6)______________________________ Theorem conditions for (1)_______________________ below hold, then the distribution of (1)______________________________ is (7)______________________________.
   a) ____.
   b) ____.
   c)

E. What does a p-value really mean?

Because the sampling distribution of (1)_____________________________ is (7)____________________, we are able to calculate the p-value which represents:

p-value = P((1)______________________ **that are at least as suspicious (in favor of the alternative hypothesis) as** (8)____________________

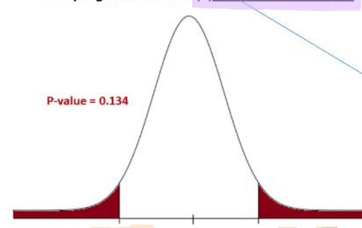
***assuming that* (9)__________________________)**

For this problem, a (1)_________________________________ that is at exactly as suspicious (of the null hypothesis) as (8)_____________________________ is (10)_____________________.

F. Calculating the p-value

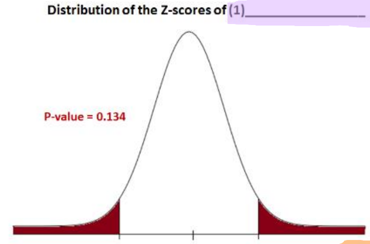
We will assume $H_0: \mu = 3$ in this entire box.

Sampling Distribution of (1)_________________



(10)__________ (11)__________ (8)__________

Distribution of the Z-scores of (1)_________________



-|z-score of (8)__________| (13)__________ |z-score of (8)__________|

Interpreting the p-value

The p-value is the area represented in red (in all two plots to left).

Therefore, because our p-value that we calculated (15)______________(IS/IS NOT) smaller than $\alpha = 0.01$, it (16)____________________(DOES/DOESN'T) make us suspicious enough of our base assumption, to make us claim that there is sufficient evidence to suggest $H_A: \mu \neq 3$.

Furthermore, because the sampling distribution of (1)______________________________ is (7)____________________, the distribution of the **z-scores** of the (1)_________________________ follows the (12)______________________________ distribution, which we know has a mean of (13)______________ and a standard deviation of (14)______________.