Assignment HW12 due 04/29/2020 at 11:59pm CDT

1. (1 point)

(Hypothetical.) A box is full of thousands of numbered tickets. It is believed that the average of all the tickets in the box is 30 with a SD of 10. To test the null hypothesis that the average is 30, we draw 100 tickets at random. The numbers on these 100 tickets average out to 29 with a standard deviation of 8.

Round your values to three decimal places.

If the null hypothesis is right, then the expected value of the average of 100 random draws from this box is ___.

If the null hypothesis is right, then the standard error of the average of 100 random draws from this box is ___.

The observed average is ___.

The test statistic is ___.

The *P*-value is approximately ___.

Answer(s) submitted:

- 30
- 1
- 29
- -1
- 0.159

(correct)

2. (1 point)

(Hypothetical.) A box is full of thousands of tickets labeled either 0 or 1. It is believed that the average of all the tickets in the box (that is, the proportion of 1's) is 0.20 or 20
Round your values to three decimal places.

You can choose to work with the sum or the average (that is, the number of 1's or the proportion of 1's); the test statistic will be the same. Use this problem to practice this idea.

If the null hypothesis is right, then the expected value of the *number* of 1's in 400 random draws from this box is ___ with a standard error of ___. The observed number of 1's is ___.

If the null hypothesis is right, then the expected value of the *proportion* of 1's in 400 random draws from this box is ___ with a standard error of ___.The observed proportion of 1's is ___.

The test statistic is ___.

The *P*-value (using a *z*-test) is approximately ___.

Answer(s) submitted:

- 80
- 8
- 102
- 80/400
- 0.02

- 0.255
- 2.75
- 0.003

(correct)

3. (1 point)

(Hypothetical.) Of registered voters in a certain county, 48

Round your values to three decimal places.

The test statistic is ___.

The *P*-value is approximately ___.

Answer(s) submitted:

- 1.969
- 0.0245

(correct)

4. (1 point)

(Hypothetical.) At University A, 58

Round your values to three decimal places.

The expected value of the difference between the numbers of females in each sample is ___.

The standard error of this difference is ___.

Answer(s) submitted:

- 6
- 7.023

(correct)

5. (1 point)

(Hypothetical.) The average salary of all residents of a city is thought to be about $39,000. A research team surveys a random sample of 200 residents; it happens that the average salary of these 200 is about $40,000 with a SD of $12,000. Make a z-test of the null hypothesis that this difference was just chance (in the sampling).

Round your values to three decimal places.

The test statistic is ___.

The *P*-value is approximately ___.

Answer(s) submitted:

- 1.178
- 0.119

(correct)

6. (1 point)

(Hypothetical.) A certain type of soda has 200 calories in a one liter bottle, according to the label. A small simple random sample of such bottles has the following calorie measurements:

202 205 201 202 198

Four out of five measurements are over 200. Test the null hypothesis that the correct measurement is 200 calories and the different observations are due simply to chance measurement error. (Assume measurement error to be Normally distributed).

Round your values to three decimal places.

The test statistic is ___.

The *P*-value is approximately ___. (Calculator required.)

Answer(s) submitted:

- 1.425
- 0.1136

(correct)

7. (1 point)

An American roulette wheel has 38 slots and 18 of these are red. At a certain roulette table, during 190 spins it landed red 78 times. This is less than the expected value. Could chance explain the difference? Make a *z*-test of the null hypothesis that the wheel is fair.

If the wheel is fair, the expected value of the number of reds after 190 spins is _____, and the SE of the number of reds is _____.

The z-statistic is _____.

The observed significance level is approximately _____.

Answer(s) submitted:

- 90
- 6.882
- -1.744
- 0.0406

(correct)

8. (1 point)

(Hypothetical.) A random sample of 100 people from City A has an average IQ of 120 with a SD of 18. Independently of this, a random sample of 150 people from City B has an average IQ of 116 with a SD of 15. Are residents of City A smarter on average? Make a *z*-test of the difference in average IQs; the null hypothesis is that there is no difference.

Round your values to three decimal places.

If the null is right, the expected value of the difference between average IQs in each sample is ___, and the standard error of this difference is estimated to be ___.

The observed difference is ___.

The test statistic is ___.

The *P*-value is approximately ___.

Answer(s) submitted:

- 0
- 2.1771
- 4
- 1.8373
- 0.03308

(correct)

9. (1 point)

Answer the entire problem before submitting.

The purpose of this problem is to interpret a *P*-value correctly.

$$\begin{array}{rcl} 1 & = & \text{True} \\ 0 & = & \text{False} \end{array}$$

a. ___ If *P*-value $= 7\%$, then the result is not statistically significant.

b. ___ We have to accept the null hypothesis if *P*-value $> 5\%$

c. ___ We should never reject the null hypothesis if *P*-value $> 5\%$.

d. ___ For a given hypothesis test, about 5

e. ___ If *P*-value $= 3\%$, then there is about a 3

Answer(s) submitted:

- 1
- 0
- 1

- 1
- 0

(score 0.800000011920929)