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Extra Problems

Question

1/1 point (graded)

The following tables contain summarized output from a statistical software package. One is correct; the others were edited to be incorrect.

A.

One-Sample Z			
Test of mu = 45000 vs not = 45000			
The assumed standard deviation = 3000			
N	45		
Mean	46255		
95% CI	(43378, 44132)		
Z	2.81		
P	0.105		

B.

One-Sample Z			
Test of mu = 45000 vs not = 45000			
The assumed standard deviation = 3000			
N	45		
Mean	46255		
95% CI	(44378, 47132)		
Z	2.81		
P	0.021		

C.

One-Sample Z	
Test of mu = 45000 vs not = 45000	
The assumed standard deviation = 3000	
N	45
Mean	46255
95% CI	(45378, 47132)
Z	2.81
P	0.005

D.

One-Sample Z	
Test of mu = 45000 vs not = 45000	
The assumed standard deviation = 3000	
N	45
Mean	46255
95% CI	(45378, 47132)
Z	2.81
P	0.072

E.

One-Sample Z	
Test of mu = 45000 vs not = 45000	
The assumed standard deviation = 3000	
N	45
Mean	46255
95% CI	(44378, 47132)
Z	2.81
P	0.005

Which of the following is the correct output?

- A
- B
- C ✔
- D
- E

Answer

Correct: With a p-value of 0.005, the interval should not contain the null value of 45,000.

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Scenario: Fuel Economy for Two-Seater Automobiles

The purpose of this activity is to give you guided practice in going through the whole process of hypothesis testing for the population mean (assuming that σ is known).

Background:

Every year, the Environmental Protection Agency (EPA) collects data on fuel economy. With rising gasoline prices, consumers are using these figures as they decide which automobile to purchase. We will look at two-seater automobiles, many of which are sporty vehicles. Based upon the latest 2007 EPA sample, we wish to test the hypothesis that the combined city and highway miles per gallon (mpg) of two-seater automobiles is greater than 20. The standard deviation for all vehicles is 4.7 mpg. We identify the 71 two-seater automobiles in the EPA data set for our sample and record their combined city and highway miles per gallon (mpg).

Question (1/1 point)

State the null and alternative hypotheses, and define clearly what the parameter μ represents.

Your Answer:

Ho: μ = 20
Ha: μ > 20

Our Answer:
The parameter μ represents the mean number of miles/gallon for all two-seater automobiles. Since we wish to find out if this number is greater than 20, the hypotheses would be: H0: μ = 20 Ha: μ > 20

Resubmit Reset

Question (1/1 point)

Below is a histogram of the data. Have the conditions that allow us to safely use the z-test been met?

Your Answer:

No histogram, still :(but i'd check:
1. If the distribution was normal
2. If it was randomly sampled
3. If distribution does not have normal distribution, make sure sample size is at least 30

Our Answer:
There are two conditions we need to check: (i) that the sample is random, and (ii) that the Central Limit Theorem has been satisfied. (i) Since the data were collected by the EPA (a federal government agency) we can be assured that good statistical sampling was done. (ii) Although the histogram is somewhat skewed to the left, the sample size is 71, which is more than 30. So, the skew does not matter.

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Question

1/1 point (graded)
Given that we know that n = 71, μ = 20 and σ = 4.7, we calculate the sample mean for the 71 two-seater automobiles is 20.38. What is the value of the z statistic? Report your answer to TWO decimal places.

0.68 ✔

0.68

Answer
Correct: The z-test is calculated by: (20.38 - 20) / (4.7 / √(71)) = 0.68

Submit

Question (1/1 point)

Given that the p-value for the z test statistic above is 0.248, what conclusion would you draw?

Your Answer:

Not enough evidence to reject Ho, because the test statistic has a 0.248 probability of being observed.

Our Answer:
The p-value of 0.248 (using the 0.05 level of significance) tells us that the data do not provide sufficient evidence to reject the null hypothesis that the combined city and highway mpg for two-seater automobiles is 20.

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