Question: In your calculations please use at most three decimal points. F...

In your calculations please use at most three decimal points. For brief explanations, two or three sentences is enough.

A company wants to evaluate their customer service's success and increase their salaries if they are successful. For this purpose they call their customers, and ask them to grade the customer service with a value from 1 to 10. The company would call the customer service successful if they get an average grade that is significantly higher than 7 from the customers. 17 customer replied the calls and the mean is 7.8. The standard deviation of any customer's response is 1.4. Assume the population is normally distributed where the standard deviation of any customer's response is 1.4 and each customer answered the question independently.

a) With 95% confidence, can the customer service be regarded as successful? Please state null and alternate hypotheses (H0 and HA).

b) What if one customer who gave 10 mistakenly gives 1? Can the customer service still be regarded as successful with 95% confidence?

c) For part b, what if there were 45 customers in the survey? Does the mistake still affect the customer service's success with 95% confidence? Briefly explain the results.

d) What if the threshold for success is set to 8 for 95% confidence. Briefly explain why we don't need to make any calculations to evaluate success in this case.

Expert Answer

Anonymous answered this
69 answers

Was this answer helpful? 1 0

a)

GIVEN:

$$\bar{X} = 7.8, n = 17, s = 1.4$$

Hypothesis:

H_0= CUSTOMER SERVICE CANNOT BE REGARDED AS SUCCESSFUL.(sample mean is equal to 7)

H_1= CUSTOMER SERVICE CAN BE REGARDED AS SUCCESSFUL.(sample mean is greater than 7)

$$H_0 : \mu = 7$$

$$H_a : \mu > 7$$

The significance level is α=0.05, and the critical value for a right-tailed test at α=0.05 is t_c = 1.746.

The rejection region for thistest is t > 1.746 .

TEST STATISTIC:

$$t = \frac{\bar{X} - \mu_0}{s/\sqrt{n}}$$

$$: = \frac{7.8 - 7}{1.4/\sqrt{17}}$$

$$= 2.356$$

Since , t = 2.356 > t_c = 1.746, it is concluded that **the null hypothesis is rejected.**

CUSTOMER SERVICE CAN BE REGARDED AS SUCCESSFUL.

b) new mean when a customer who gave 10 mistakenly gives 1 =

$$7.8 - \frac{10}{17} + \frac{1}{17} = 7.1532$$

as 7.8 is the mean of 17 observations , so we deleted that one 10 rated observation from the mean and added 1 rated observation.

Now , we will test the same hypothesis: with mean = 7.1532

i am only computing test statistics here, everything except it is same:

$$t = \frac{\bar{X} - \mu_0}{s/\sqrt{n}}$$

$$= \frac{7.1532 - 7}{1.4/\sqrt{17}}$$

$$= 0.451$$

c) New mean if there are 45 customers in the survey =

$$7.8 - \frac{10}{45} + \frac{1}{45} = 7.556$$

we will just change 17 to 45 as now n= 45.

Now , we will test the same hypothesis: with mean = 7.556

$$t = \frac{\bar{X} - \mu_0}{s/\sqrt{n}}$$

$$= \frac{7.556 - 7}{1.4/\sqrt{17}}$$

$$= 1.637$$

Since , t = 1.637 < t_c = 1.746, it is concluded that *the* **null hypothesis is not rejected.**

CUSTOMER SERVICE CANNOT BE REGARDED AS SUCCESSFUL.

YES, THE MISTAKE STILL AFFECTS THE SURVEY EVEN AFTER THERE IS 45 CUSTOMERS IN A SURVEY .THIS IS BECAUSE THE DIFFERENCE OF THE MISTAKE IS HUGE (10-1 = 9) WHICH HAVE A VERY SIGNIFICANT EFFECT ON THE SURVEY.

d) As in all cases our mean is less than 8 , so we can conclude directly without making any calculations that in this case customer service cannot be regarded as successfull.

PLEASE GIVE A THUMBS UP, IT ONLY TAKES A SECOND.

THANKYOU AND HAVE A NICE DAY:)

HAPPY STUDYING

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