Section: __________ Date:___________ Name:______________________________

<u>Quiz 13 is about section 12</u> on hypothesis Testing about population mean.

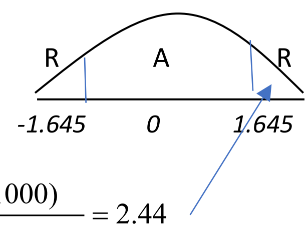
1) In a certain community, a claim is made that the average income of all employed individuals is not \$55,500. A random sample of 121 employed individuals has a mean of \$56,500 with a population standard deviation of \$4,500. Use α = 0.10. Show all the steps.

α = **0.10** and $n = 121$

SC: $\mu \neq 55,500$ Ho: $\mu = 55,500$ $n = 121$ $\bar{x} = 56,500$ $s = 4,500$

OC: $\mu = 55,500$ H_1: $\mu \neq 55,500$ (It is two tailed test because H_1: $\mu \neq$)

α =**0.10** and $n = 121$ then critical value or ***CV*** $= 1.645$



$$\text{TS}= \frac{\sqrt{n}(\bar{x}-\mu)}{s} = \frac{\sqrt{121}(56,500-55,500)}{4,500} = \frac{11(1000)}{4,500} = 2.44$$

Conclusion: Accept or reject H_0? **Reject** H_0 because the test statistics falls inside the critical region.

Comment: Accept or reject ***SC? Accept*** *SC because SC and* H_0 ***are different format.***

P-Value = 0.0145 is less than α **=0.10 that would also results in rejection of** H_0

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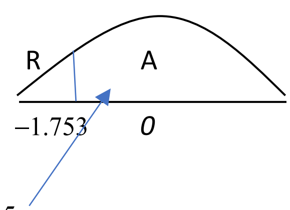
2) A newspaper states that a family in Alton, Rhode Island, on average, produces less than 5.5 pounds of organic garbage per week. A public health officer feels that the figure is incorrect. A random sample of 16 families is chosen and the mean number of pounds of organic garbage produced by these 16 families is 4.9 pounds with a standard deviation of 1.6 pounds. Test the health officer's test of the newspaper's claim, using a level of significance of 0.05.

α = **0.05** and $n = 16$

SC: $\mu < 5.5$ Ho: $\mu \geq 5.5$ $n = 16$ $\bar{x} = 4.9$ $s = 1.6$

OC: $\mu \geq 5.5$ H_1: $\mu < 5.5$ (It is a left tailed test because H_1: $\mu <$)

α = **0.05** and $n = 16$ then critical value or ***CV*** = -1.753



$$\text{TS}= \frac{\sqrt{n}(\bar{x}-\mu)}{s} = \frac{\sqrt{16}(4.9-5.5)}{1.6} = \frac{4(-0.6)}{1.6} = -1.5$$

Conclusion: Accept or reject H_0? **Accept** or fail to reject H_0 because test statistics falls in acceptable area.

Comment: Accept or reject ***SC? Reject*** *SC because SC and* H_0 ***are different format.***

P-Value =0.771 that is greater than α **= 0.05 that would result in accepting or failing to reject** H_0

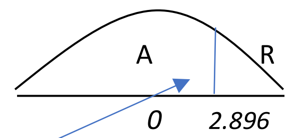
3) Mighty Dracula supervises students who are training to be hematologists. For one project their 9 students had to count certain cell types in blood samples. Their counts were 103, 75, 82,107, 63, 102, 79, 104 and 72. Does this support the hypothesis that the mean count is more than 85? Use α = 0.01. Assume that the cell counts are normally distributed with
$\bar{x} = ?,$ $s = ?$

α =0.01 and $n = 9$

SC: μ Ho: μ $n = 9$ $\bar{x} = 87.44$ $s = 16.59$

OC: μ H1: μ (left-tailed test or two tailed test or right-tailed test)

α = 0.01 and $n = 9$ then critical value or ***CV*** $= 2.896$



$$\textbf{TS=}\ \frac{\sqrt{n}(\bar{x}-\mu)}{s} = \frac{\sqrt{9}(87.44-85)}{16.59} = 0.442$$

Conclusion: Accept or reject H_0? **Accept** or fail to reject H_0 because test statistics falls in acceptable area.

Comment: Accept or reject ***SC? Reject*** *SC because SC and* H_0 ***are different format.***

P-Value =0.335 that is greater than **α = 0.01 that would results in accepting or failing to reject** H_0

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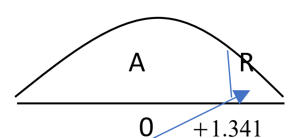
4) Suppose that scores on the Scholastic Aptitude Test form a normal distribution with μ = 500. A high school counselor has developed a special course designed to **increase** SAT scores. A random sample of 16 students is selected to take the course and then the SAT. The sample had an average score of $\bar{x} = 530$ s = 80. Does the course **increase** SAT scores? Test at α = 0.10. Show all steps.

α = 0.10 and $n = 16$

SC: $\mu > 500$ Ho: $\mu \le 500$ $n = 16$ $\bar{x} = 520$ $s = 80$

OC: $\mu \le 500$ H1: $\mu > 500$ (It is two tailed test because H1: $\mu \ne$)

α = 0.10 and $n = 16$ then critical value or ***CV*** = ± 1.341



$$\textbf{TS=}\ \frac{\sqrt{n}(\bar{x}-\mu)}{s} = \frac{\sqrt{16}(530-500)}{80} = \frac{4(30)}{80} = 1.5$$

Conclusion: Accept or reject H_0? **Reject** H_0 because test statistics falls in critical region area.

Comment: Accept or reject ***SC? Accept*** *SC because SC and* H_0 ***are different.***

P-Value =0.077 that is less than **α = 0.10 that would results in rejecting** H_0