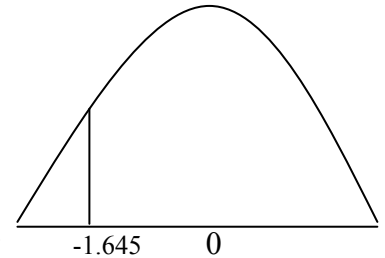# Hypotheses about $\mu$

Large and Small sample

**P. 1**) Leno Co. claims that the mean life of their batteries is at least 60 months. Test this claim with significance level $\alpha = .05$, when a sample of 36 batteries has an average life of 57.5 months with st. dev. of 16 months.

| | | | |
|---|---|---|---|
| **Stated Claim**: $\mu \geq 60$ | Ho: $\mu \geq 60$ | $n = 36$ | $\overline{x} = 57.5$ | $s = 16$ |
| **Opposing Claim**: $\mu < 60$ | H$_1$: $\mu < 60$ | | | |

$CV = -1.645$

**Test Statistic**$: = \boldsymbol{ts} = z = \dfrac{\sqrt{n}(\overline{x} - \mu)}{s} = \dfrac{\sqrt{36}(57.5 - 60)}{16} = -0.938$ *Falls not inside CR*

-1.645     0

**Conclusion**: Accept or reject **H$_0$**?     Accept Ho:
**Comment**: Accept or reject **SC**?     Accepting that the mean life of batteries is at least 60 months.
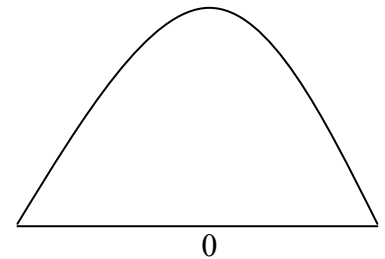
_____

**P. 2**)  Leno Co. claims that the mean life of their batteries is at least 60 months. Test this claim with significance level $\alpha = .05$, if a sample of 25 batteries has mean life of 57.5 months with standard deviation of 16 months.

**SC**: $\mu$          Ho: $\mu$          $n =$          $\overline{x} =$          $s =$
**OC**: $\mu$          H$_1$: $\mu$

$CV =$

**Test Statistic** $= \boldsymbol{ts} = $ _____

0

**Conclusion**: Accept or reject **H$_0$**?
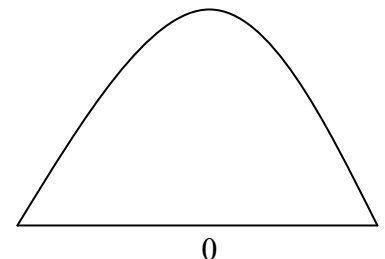
**Comment**:  Accept or reject **SC**?

**P. 3**)  Leno Co. claims that the mean life of their batteries is more than 60 months. Test this claim when a sample of 25 batteries has an average life of 62.3 months and standard deviation of 4 months with $\alpha = .025$.

**SC**:          Ho:          $n =$          $\overline{x} =$          $s =$
**OC**:          H$_1$:
$CV =$

**Test Statistic**$: = $ _____

0

**Conclusion:** Reject or fail to reject **Ho**?

**Comment**:  Accept or reject **SC**?

**P. 4)**  Leno Co. claims that the mean life of their batteries is at most 60 months. Test this claim with significance level 0.10, if a sample of 36 batteries has mean life of 64.8 months with standard deviation of 12 months.

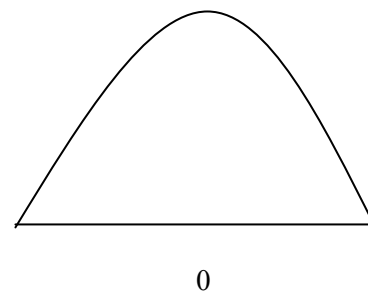*SC*:              Ho:                    $n =$              $\overline{x} =$              $s =$

*OC*:              H$_{1:}$

*CV* =

Test Statistic = *ts* = _____

**Conclusion:** Accept or reject **H$_0$**?

0

**Comment**:  Accept or reject **SC**?

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**P. 5)**  Leno Co. claims that their batteries have an average life of 60 months. Test this claim when a sample of 36 batteries has  mean life of 57.5 months with standard deviation of 6 months. $\alpha = 0.01$

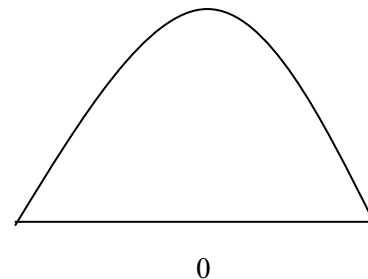*SC*:                    Ho:              $n =$              $\overline{x} =$              $s =$

*OC*:                    H$_{1:}$

*CV* =

*Test Statistic = ts* = _____

**Conclusion**: Accept or reject **H$_0$**?                    0

**Comment**:  Accept or reject **SC**?

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**P. 6)**  Leno Co. claims that their batteries have an average life of 60 months. Test this claim if a sample of 25 batteries has mean life of 63.5 months with standard deviation of 8 months.  $\alpha = 0.05$

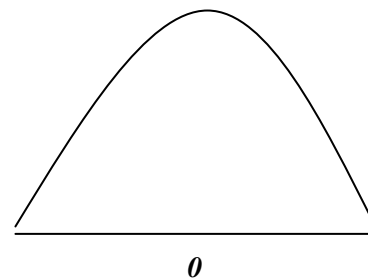*SC*:                    Ho:              $n =$              $\overline{x} =$              $s =$

*OC*:                    H$_{1:}$

 *CV* =

*Test Statistic = ts* = _____

*0*

**Conclusion**: Accept or reject **H$_0$**?

**Comment**:  Accept or reject **SC**?

**P. 7)** Leno Co claims that the mean life of their batteries is less than 60 months. Test this claim when a sample of 49 batteries has mean life of 53.6 months with standard deviation of 20 months.  $\alpha = 10\%$ .
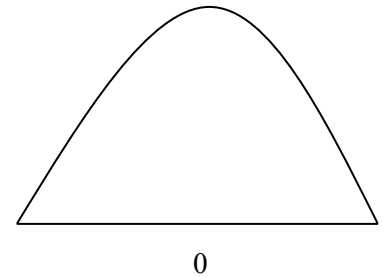
*SC*:　　　　　　　　　Ho:　　　　　　$n =$　　　$\overline{x} =$　　　　　$s =$

*OC*:　　　　　　　　$H_{1:}$

*CV=*

*Test Statistic= ts =* _____

**Conclusion:** Accept or reject **H₀**?

**Comment**:  Accept or reject **SC**?

0

_____

**P. 8)** Leno Co. claims that the mean life of their batteries is less than 60 months. Test this claim with  $\alpha = 5\%$ , if a sample of 16 batteries has mean life of 52.4 months with  standard deviation of 14 months.

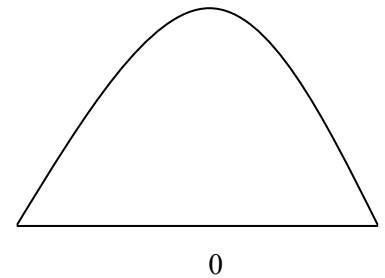*SC*　　　　　　　　　Ho:　　　　　　$n =$　　　$\overline{x} =$　　　　$s =$

*OC*:　　　　　　　　$H_{1:}$

*CV=*

*Test Statistic = ts =* _____

**Conclusion** Accept or reject **H₀**?

**Comment**: Accept or reject **SC**?

0

**P. 9)** Leno Co. claims that the mean life of their batteries is more than 60 months. Test this claim with $\alpha = .10$, if a sample of 9 batteries has a life of 62, 58, 59, 64, 63, 61, 59, 62, 58 months.

*SC*:　　　　　　　　　Ho:　　　　　　$n =$　　　$\overline{x} =$　　　　$s =$
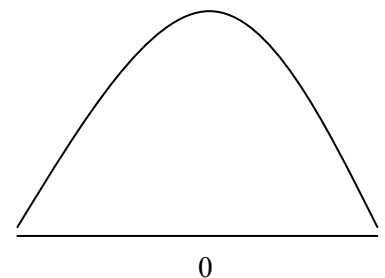
*OC*:　　　　　　　　$H_{1:}$

*CV=*

*Test Statistic = ts =* _____

**Conclusion:** Accept or reject **H₀**?

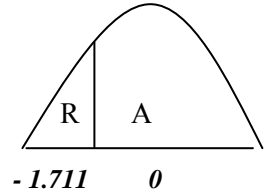**Comment**:  Accept or reject **SC**?

0

# Answers To Practice Problems

**Practice 2.**

**SC**: $\mu \geq 60$      **Ho**: $\mu \geq 60$        $n = 25$        $\bar{x} = 57.5$        $s = 16$

**OC**: $\mu < 60$      **H$_1$**: $\mu < 60$

**CV** $= t = -1.711$        **TS** $= t = \dfrac{\sqrt{n}(\bar{x} - \mu)}{s} = \dfrac{\sqrt{25}(57.5 - 60)}{16} = -0.781$
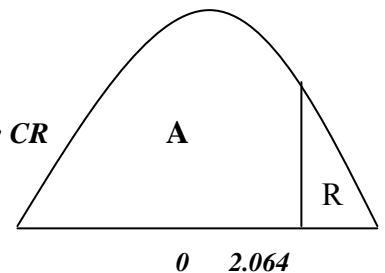
**Conclusion**: Accept Ho      **Comment**: Company's claim is true.

**Practice 3.**

**SC**: $\mu > 60$      **Ho**: $\mu \leq 60$        $n = 25$        $\bar{x} = 62.3$        $s = 4$
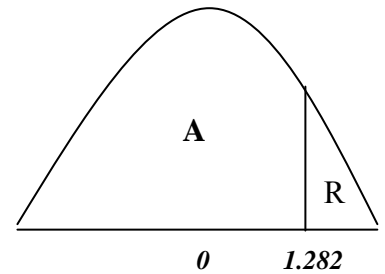
**OC**: $\mu \leq 60$      **H$_1$**: $\mu > 60$

**CV** $= t = 2.064$   **TS**: $= t = \dfrac{\sqrt{n}(\bar{x} - \mu)}{s} = \dfrac{\sqrt{25}(62.3 - 60)}{4} = 2.875 \Rightarrow$ ***It falls inside CR***

**Conclusion**: Reject Ho        **Comment**: Company's claim is true

**Practice 4.**   **SC**: $\mu \leq 60$        **Ho**: $\mu \leq 60$        $n = 36$        $\bar{x} = 64.8$        $s = 12$

                   **OC**: $\mu > 60$        **H$_1$**: $\mu > 60$

**CV** $= z = 1.282$    **Test Statistic**: $z = \dfrac{\sqrt{36}(64.8 - 60)}{12} = 2.4 \Rightarrow$ ***It falls inside CR***

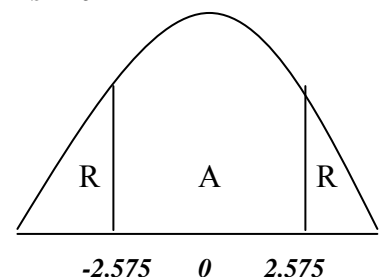**Conclusion**: Reject Ho      **Comment**: Company's claim is false.

**Practice 5.**

**SC**: $\mu = 60$        **Ho**: $\mu = 60$        $n = 36$        $\bar{x} = 57.5$        $s = 6$

**OC**: $\mu \neq 60$        **H$_1$**: $\mu \neq 60$

**CV** $= z = \pm 2.575$

**TS** $= z = \dfrac{\sqrt{36}(57.5 - 60)}{6} = -2.5$        $\Rightarrow$ ***Falls not inside CR***

 **Conclusion**: Accept Ho

**Comment**: Accepting that the mean life of batteries is 60 months, so company's claim is true.

**Practice 6**.

SC: $\mu = 60$       Ho: $\mu = 60$        $n = 25$       $\bar{x} = 63.5$       $s = 8$
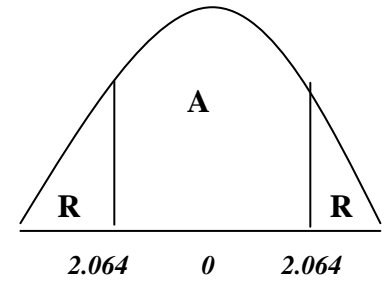
OC: $\mu \neq 60$       H$_1$: $\mu \neq 60$

$CV = = \pm 2.064$

TS $= t = \dfrac{\sqrt{25}(63.5 - 60)}{8} = 2.19$   $\Rightarrow$ *It falls inside CR*

**Conclusion**: Reject Ho       **Comment**: Reject the company's claim

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**Practice 7.**

SC: $\mu < 60$       Ho: $\mu \geq 60$        $n = 49$       $\bar{x} = 53.6$       $s = 20$
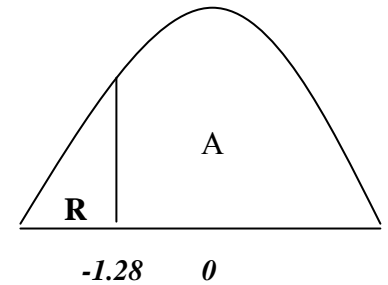
OC: $\mu \geq 60$       H$_1$: $\mu < 60$

$CV = z = -1.28$

TS $= z = \dfrac{\sqrt{49}(53.6 - 60)}{20} = -2.24$   $\Rightarrow$ *It falls inside CR*

**Conclusion**: Reject Ho       **Comment**: Accept the company's claim.

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**Practice 8.**

SC: $\mu < 60$       Ho: $\mu \geq 60$        $n = 16$       $\bar{x} = 52.4$       $s = 14$
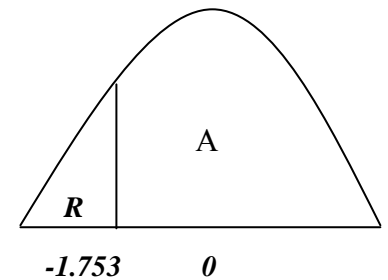
OC: $\mu \geq 60$       H$_1$: $\mu < 60$

**CV:** $= t = -1.753$

**TS** $= t = \dfrac{\sqrt{16}(52.4 - 60)}{14} = -2.17$   $\Rightarrow$ *It falls inside CR*

**Conclusion**   Reject Ho       **Comment**: Accept the company's claim.

**Practice 9**.

SC: $\mu > 60$       Ho: $\mu \leq 60$        $n = 9$       $\bar{x} = 60.66$       $s = 2.24$

OC: $\mu \leq 60$       H$_1$: $\mu > 60$

$CV = t = 1.397$     **TS** $= = t = \dfrac{\sqrt{9}(60.66 - 60)}{2.24} = 0.884$     $\Rightarrow$ *Falls not inside CR*

**Conclusion**: Accept Ho       **Comment**: Reject the company's claim.