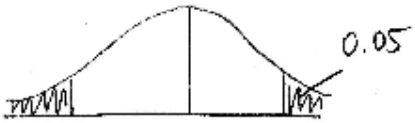
Solutions

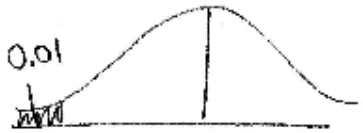
(1) $\alpha = 0.10$ $df = 15$



-1.753 $t_{\alpha/2} = 1.753$

$\boxed{-1.753 \text{ and } 1.753}$

(2) $\alpha = 0.01$ $df = 8$



$-t_\alpha = -2.896$

$\boxed{-2.896}$

(3) $n = 8$ $\bar{x} = 7.87$ $s \approx 0.807$ (normal population, $n < 30$, σ unknown)

$\alpha = 0.1$ $df = 7$ $t_{\alpha/2} = 1.895$

$$\bar{x} \pm t_{\alpha/2} \frac{s}{\sqrt{n}}$$

$$7.87 \pm 1.895 \left(\frac{0.807}{\sqrt{8}}\right)$$

$\boxed{7.33 \leq \mu \leq 8.41}$

④ $n=8 \quad \bar{x}=7.87 \quad s\approx 0.807$ (normal population, $n<30$, σ unknown)

$\alpha=0.1 \quad df=7 \quad t_\alpha=1.415$

$$\bar{x}+t_\alpha\frac{s}{\sqrt{n}}$$

$$7.87+1.415\left(\frac{0.807}{\sqrt{8}}\right)$$

$$\boxed{\mu\leq 8.27}$$

⑤ $n=20 \quad \bar{x}=10.5 \quad s\approx 1.620$ (normal population, $n<30$, σ unknown)

$\alpha=0.05 \quad df=19 \quad t_{\alpha/2}=2.093$

$$\bar{x}\pm t_{\alpha/2}\frac{s}{\sqrt{n}}$$

$$10.5\pm 2.093\left(\frac{1.620}{\sqrt{20}}\right)$$

$$\boxed{9.742\leq \mu\leq 11.258}$$

⑥ $n=20 \quad \bar{x}=10.5 \quad s\approx 1.620$ (normal population, $n<30$, σ unknown)

$\alpha=0.01 \quad df=19 \quad t_\alpha=2.539$

$$\bar{x}-t_\alpha\frac{s}{\sqrt{n}}$$

$$10.5-2.539\left(\frac{1.620}{\sqrt{20}}\right)$$

$$\boxed{9.580\leq \mu}$$

(7) 1) $H_0: \mu = 10$ $H_a: \mu > 10$

right-tailed

2) Assumptions: normal population
$n < 30$
σ unknown

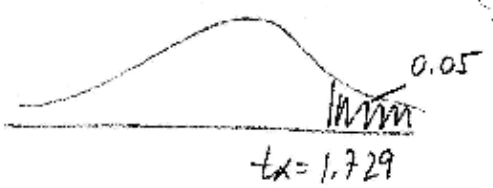
3) $t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$

$= \frac{10.5 - 10}{(1.620/\sqrt{20})}$

≈ 1.380

4) $df = 19$ $t_\alpha = 1.729$
$\alpha = 0.05$

right-tailed



5) Don't reject H_0.
$\mu = 10$

6) p-value: $df = 19$

$t_{0.1}$	$t_{0.05}$
1.328	1.729

$0.05 < p < 0.1$

(8) 1) H_0: $\mu = 355$ H_a: $\mu < 355$

left-tailed

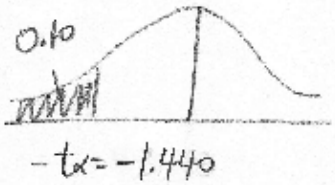
2) Assumptions: normal population ←
$n < 30$ ←
σ unknown ←

3) $n = 7$ $\bar{x} \approx 354.871$ $s \approx 0.269$

$$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}} \approx -1.269$$

4) $df = 6$
$\alpha = 0.10$

left-tailed



5) Don't reject H_0
$\mu = 355$

6) p-value:
$df = 6$

$t_{0.1}$	$t_{0.05}$
1.440	1.943

$p > 0.1$

(9) 1) $H_0: \mu = 600$ $H_a: \mu \neq 600$

Two-tailed

2) Assumptions: normal population
$n < 30$
σ unknown

3) $n = 9$ $\bar{x} \approx 592.667$ $s \approx 7.365$

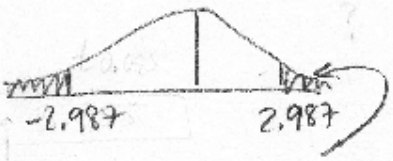
$$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$$
$$\approx -2.987$$

4) $df = 8$
$\alpha = 0.05$

Two-tailed

5) Reject H_0
$\mu \neq 600$

6) p-value?



$df = 8$:

$t_{0.01}$	$t_{0.005}$
2.896	3.355

2.987

$0.005 < \text{area} < 0.01$

$0.01 < p < 0.02$

(10) 1) $H_0: \mu = 8$ $H_a: \mu \neq 8$ two-tailed

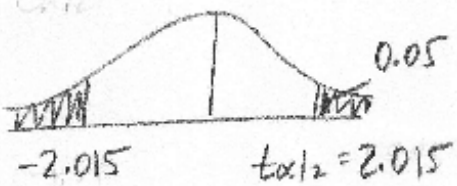
2) Assumptions: normal population
$n < 30$
σ unknown

3) $n = 6$ $\bar{x} = 8.4$ $s \approx 0.556$

$$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}} \approx 1.762$$

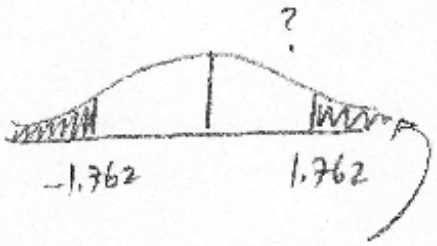
4) $df = 5$
$\alpha = 0.10$

two-tailed



5) Don't reject H_0.
$\mu = 8$

6) p-value?



$df = 5$:

$t_{0.1}$	$t_{0.05}$
1.476	2.015

1.762

$0.05 < \text{area} < 0.1$

$0.1 < p < 0.2$