μ σ = population standard deviation (parameter)

$\bar{x}$ s = sample standard deviation (statistic)

$p = p_0$

μ_0

$H_0: \mu = \mu_0$

$H_a: \mu \neq \mu_0$

$\sigma_{\hat{p}} = \sqrt{\frac{p_0(1-p_0)}{n}}$

$d = .01, .02, .05$

$< .01$ pretty strong

$< .001$ very strong evidence against H_0

#7

chapt 8 WS.

$n = 12$

99% C.I.

$\bar{x} = 22.25$

$s = 4.8077$

$\bar{x} \pm E$

$E = t s_{\bar{x}}$

$E = 3.1058(1.3879)$

$E \approx 4.3105$

round up

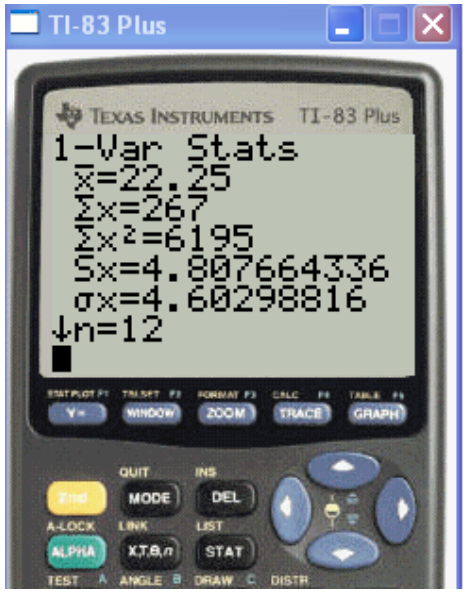
4.32

$22.25 + 4.32 = 26.57$

$22.25 - 4.32 = 17.93$

$(17.93, 26.57)$

99% confidence interval



$s_{\bar{x}} = \frac{4.8077}{\sqrt{12}}$

≈ 1.38785

$\alpha = 1 - .99 = .01$

$\frac{\alpha}{2} = .005$

$t = -\text{invT}(.005, 11)$

≈ 3.1058

3 b) 98%

$800(.98) = 784$

μ will be in 784 of these confidence intervals

2 b) a) 97% C.I. $\sigma = 16.3$ hrs $\alpha = .03$

$n = 42$ $\frac{\alpha}{2} = .015$

$\bar{x} = 930.2$ hrs

$E = z\sigma_{\bar{x}}$

$= 2.1701(2.5151)$ $\sigma_{\bar{x}} = \frac{16.3}{\sqrt{42}} \approx 2.5151$

≈ 5.4581

$E \approx 5.5$

$z = \text{invNorm}(.015)$

≈ 2.1701

b) 5.46

c) $n = \frac{(z^2)(\sigma)^2}{E^2}$

$= \frac{(2.1701)^2(16.3)^2}{4^2}$

≈ 78.201

$n = 79$

Check

$E = \frac{(2.1701)(16.3)}{\sqrt{79}}$

≈ 3.9797

① Chapt 9 WKS

$\mu_0 = \$1.492$ at end of 2002

$n = 30$ 2004

$\bar{x} = 1.661$

$S = 0.315$

$S_{\bar{x}} = \frac{0.315}{\sqrt{30}}$

$S_{\bar{x}} \approx .057511$

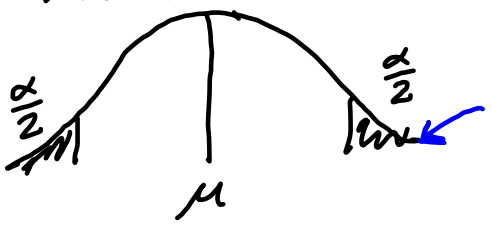
Let μ = the overall avg price of gas in 2004

$H_0: \mu = 1.492$

$H_a: \mu \neq 1.493$ two tailed test

$t = \frac{1.661 - 1.492}{.057511}$

$t \approx 2.9386$



$\frac{1}{2}p = P(t > 2.9386) = tcdf(2.9386, E99, 29)$

$\approx .0032$

$p = .0064$

$.0064 < .01$ ∴ reject H_0

The average price of gas has changed since 2002

2. $n = 200$

$\bar{x} = 13.75$

$s = 3.0$

$\sqrt{a}$ $\mu < 14$

$H_0: \mu \geq 14$

$H_a: \mu < 14$

$s_{\bar{x}} = \frac{3.0}{\sqrt{200}} \approx .212132$

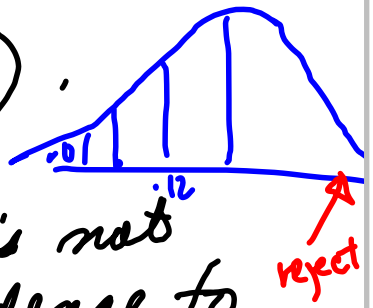
$t = \frac{13.75 - 14}{.212132} = -1.1785$ $\quad t_{obs} = \frac{\bar{x} - \mu}{s_{\bar{x}}}$

p-value $= P(t < -1.1785) =$

tcdf(-E99, -1.1785, 199)

$\approx .1200$

$.1200 > .01$ so there is not enough evidence to reject H_0



There we can not conclude that they do not work more than 14 hours.

Chapt 8

(8) $n = 450$ 81 cheated $\alpha = .05$

$\hat{p} = \frac{81}{450} \approx .18$ $\frac{\alpha}{2} = .025$

$Z = \text{invNorm}(.025)$ $s_{\hat{p}} = \sqrt{\frac{\hat{p}\hat{q}}{n}}$

≈ 1.95996

≈ 1.9600 $\approx .0181$

$1 - .18 = .82$

$E = 1.96(.0181)$ $= \sqrt{\frac{.18(.82)}{450}}$

$\approx .035476$

$\approx .0355$

$.18 + .0355 = .2155$

$.18 - .0355 = .1445$

$(.1445, .2155)$ 95% C.I.

$$E = z\,\sigma_{\bar{x}}$$
$$E = z\,s_{\hat{p}}$$
$$E = t\,s_{\bar{x}}$$

} margins of error

b) $n = \dfrac{z^2 \hat{p}\hat{q}}{E^2}$

$n = 1418$