

Discussion

Disc. Sec. 5 #2

P. R. (58)

AMS 7
15 May 17

Section week
of 15-20 May
2017

2(a) not clear if $\bar{y} = 29.8$ ①

& $\mu_0 = 32$ differ by an

amount that's practically
significant (practisig); but

we can compute what % 29.8 is lower
than 32 by:

$$\frac{29.8 - 32}{32} = \frac{-2.2}{32} = -6.9\%$$

(7) 29.8 is 6.9% smaller than μ_0 \checkmark $\Rightarrow 7\%$

$$\frac{32 - 29.8}{29.8} = \frac{+2.2}{29.8} = +7.4\%$$

32 is
7.4% \checkmark
bigger than
29.8

rough rule of thumb: ^{relative} differences of
(5%) or more are often (but not always)
large enough to be practisig.

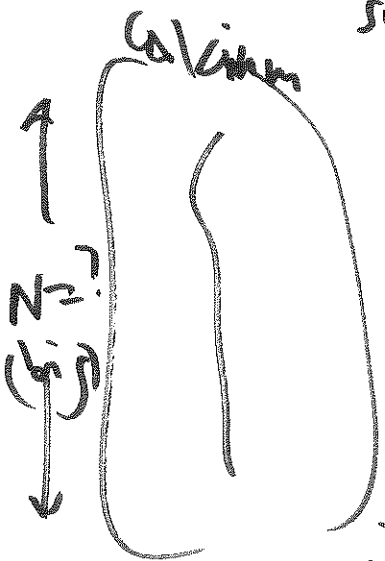
To have this diff. may well be practisig.

pop. all arthropods
 (uni lev to those in the sample)

stat. inf.

sample the observed arthropods

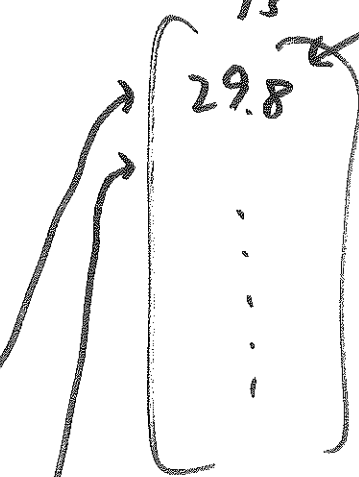
ind. (repeated-sampling)
 all possible \bar{y}



actual life → SRS = IID



mean $\bar{y} = 29.8$
 SD $s = 1.8$



EV of $\bar{y} = \mu$

mean $\mu = ?$
 SD $\sigma = ?$

hyp. IID

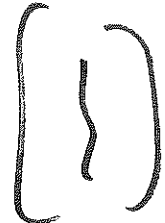


sample hist

low var mean

EV of $\bar{y} = \mu$

pop hist



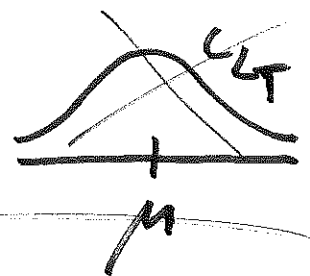
$n = 13$

mean $\bar{y} = ?$
 ex.

est. low var SD

\hat{SE} of $\bar{y} = \frac{s}{\sqrt{n}} = 0.5$

low var hist



math fact
 EV of $\bar{y} = \mu$
 $E_{IID}(\bar{y}) = \mu$

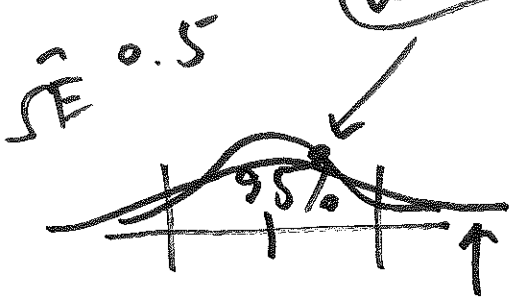
$$SE_{IID}(\bar{y}) = \frac{\sigma}{\sqrt{n}} \rightarrow$$

$$\hat{SE}_{IID}(\bar{y}) = \frac{s}{\sqrt{n}} = \frac{1.8}{\sqrt{13}} = 0.499 \approx 0.5$$

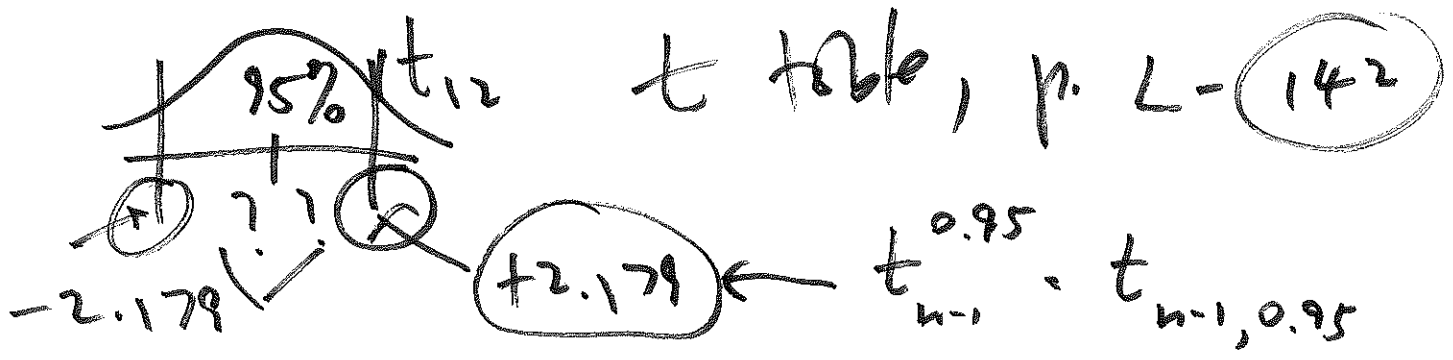
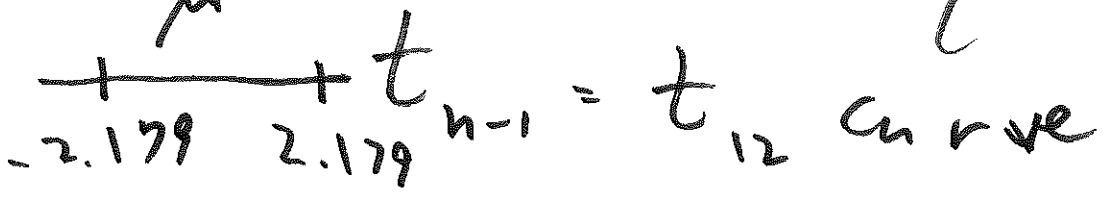
inferential summary

pop. →	unknown	
pop. →	pop. quantity of main interest	$\mu =$ pop. mean calcium concentration
sample →	estimate of μ	$\bar{y} = 29.8$
sample →	give or take for \bar{y} or est. of μ	$SE(\bar{y}) = 0.5$
sample →	95% CI for μ	$\bar{y} \pm t_{12}^{0.95} \left(\frac{s}{\sqrt{n}} \right)$ 29.8 ± 2.179

normal

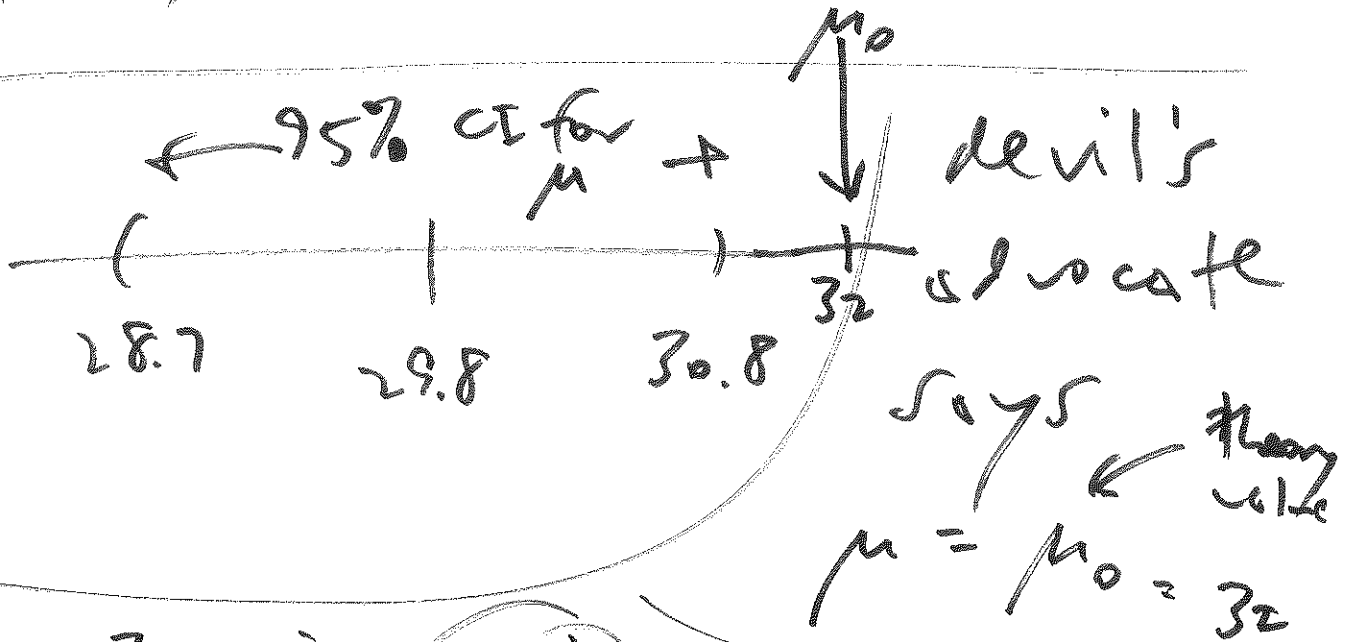
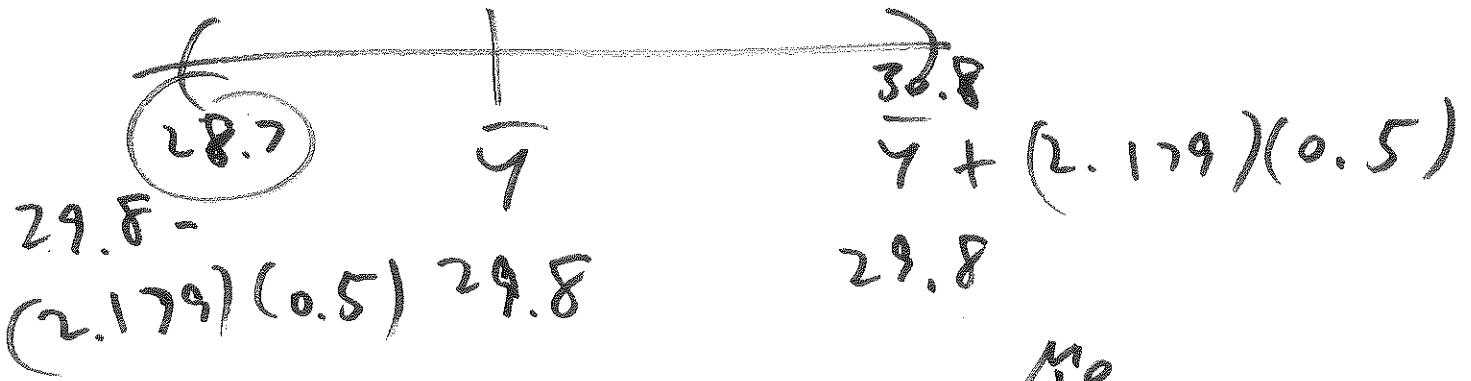


long-run hist of \bar{y} , accounting for uncertainty in σ



95% CI for μ

(4)



Since 32 is **not** in 95% CI, theory is **not** supported by data.

diff. between $\mu_0 = 32$ & $\bar{y} = 29.8$ is statistic

\leftrightarrow is (probably) **not** just unlucky sampling \leftrightarrow **is** (probably) real