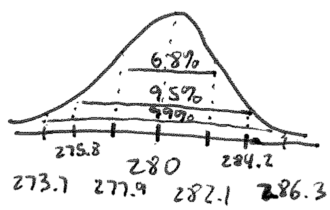
Stats CH 8-1 A 5, 7, 9, 11, 13

(5) a) Approx. Normal $\mu_{\bar{x}} = 280$, $\sigma_{\bar{x}} = \frac{60}{\sqrt{840}} = 2.07$

b)

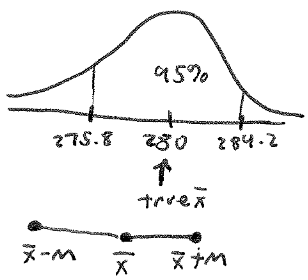


c) $m = 2 \cdot sd$ at 95%

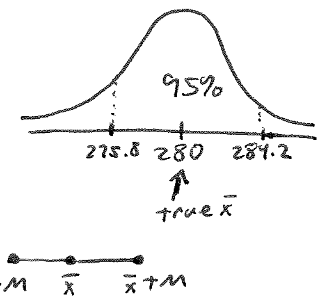
$2 \cdot 2.07 = 4.2$

d) About 95%

(7)



$\bar{x}$ chosen within



$\bar{x}$ chosen outside

the difference is that the $\bar{x}$ chosen from within the conf. interval contains the true mean while the $\bar{x}$ selected outside does <u>not</u>.

(9) 80% - you can tell the width of the conf. interval bars stretches between 1 sd. and 2 sd. from μ.

* (11) 95% $n = 1664$ 66 ± 3%

a) We are 95% sure that the true pop. proportion who favor the amendment is between 63 and 69%.

b)

c) Also, if the sampling procedure were repeated many times, about 95% of the conf. intervals computed would contain the true proportion.

* (13) Their sampling method: telephone interview. leads to nonresponse errors/bias and undercoverage of those who do not have a home phone — more error/bias.

Stats CH 8-1 and 8-2 B 17, 19-24, 27, 31, 33

* (17) 95%: 26.8 ± .6

a) Incorrect: conf. int for means, not individuals
b) Incorrect: this requires $\mu = 26.8$ - we don't know this
c) Correct
d) Incorrect: this sounds like μ moves, which it does not
e) Incorrect: there is a 5% chance μ is outside the conf. int.

* (19) Random - to infer about pop.
Normal - Conf. Int. use Normal calculations
Indep - to calculate correct st. dev.

(20) $n = 20125$ $\hat{p} = 73.5\%$ 95%: ± .61%
Not random: internet survey - no inferences to larger pop.

(21) B

(22) E

(23) $n = 25$ 95% (122, 138) (C)

* (24) 95%: .64 ± .03 80% = 1.28(.015) = .0192
2%

(B)

$1.96\,\sigma_{\hat{p}} = .03$ $\sigma_{\hat{p}} = .015$

(27) $N = 175$
$n = 50$
$p = \frac{14}{50} = .28$

random: yes - SRS
Normal: $.28 \cdot 50 = 14$, $.72 \cdot 50 = 36$ } both over 10 - OK
Indep: $50 \cdot 10 = 500$ $500 < 175$ NO - not indep.

(31) AP Stat, Finding z

$z = \pm 2.326$

(33) $n = 50$ $N = 750$
$\hat{p} = \frac{36}{50} = .72$
$1 - \hat{p} = .28$

$\sigma_{\hat{p}} = \sqrt{\frac{.28 \cdot .72}{50}}$
$= .063$

a) want p of seniors going to prom
b) Random - SRS - yes
Normal: $.72(50) = 36$, $.28(50) = 14$ } OK
Indep: $50 \cdot 10 = 500$ $500 < 750$ - OK
c) 90% $z =$ ~~[illegible]~~ 1.64

$\hat{p} \pm z \cdot \sigma_{\hat{p}} = .72 \pm 1.64(.063)$
$= .72 \pm .1044$
$(.616, .824)$

d) We are 90% conf. that the true prop. of seniors planning to attend prom is between .616 and .824

Stats CH 8-2 C 35, 37, 41, 43, 47

(35) $n = 10904$

$\hat{p} = \frac{2105}{10904} = .193$

$\sigma_{\hat{p}} = .00378$

99%

a) want p - nondrinkers

b) Checks $np = 2105$ OK
$nq = 8799$
SRS - yes
$10n < N$ - yes

c) $.193 \pm .0097$ (.183, .203)

d) We are 99% sure the true p is between 18.3% + 20.3%

(37) They could have lied

(41) $n = 2372$

$\hat{p} = \frac{1921}{2372} = .81$

$\sigma_{\hat{p}} = .0081$

95% ⟶ $.81 \pm .016$

a) This # is ok, but meaningless since the polling was not random.

b) Not random = no inference about pop.

(43) $p = .75$ want $p \pm .04$ @ 90% conf. $= z = 1.64$

a) $z \cdot sd = .04$
$1.64\ sd = .04$
$sd = .024$
⟶ $\sqrt{\frac{.25 \cdot .75}{n}} = .024$
$n = 316$
APSTAT: 318

b) $1.64\ sd = .04$
$sd = .024$
$\sqrt{\frac{.5 \cdot .5}{n}} = .024$
$n = 435$
APSTAT = 423 differ by 105

(47) $n = 1028$

$\hat{p} = .64$

$\sigma_{\hat{p}} = .015$

a) Margin Error = .03

$z \cdot sd = .03$
$z \cdot .015 = .03$
$z = 2$

$z = 2$ is 95% conf. int.

b) Non-response bias

Stats CH 8-3 D 49-52, 55, 57, 59, 63

(49) a

(50) $n = 400$ $\hat{p} = \frac{317}{400} = .7925$ error: $.79 \pm \underline{.04}$ (D)

95%

$\sigma_{\hat{p}} = .020$

(51) AP STAT 385 (C)

(52) A

* (55) $\sigma = 7.5$ $\mu \pm 1$ at 99% conf. / or AP STAT

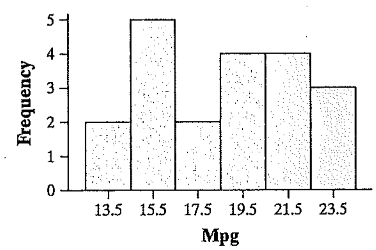
$z \cdot \frac{\sigma}{\sqrt{n}} = 1$

$2.58 \frac{7.5}{\sqrt{n}} = 1$ $\frac{19.35}{\sqrt{n}} = 1$ $19.35 = \sqrt{n}$ $375 = n$

* (57) t-dist.

a) 95% conf. $df = 10-1 = 9$ $t = 2.262$

b) 99% conf. $df = 20-1 = 19$ $t = 2.861$



* (59) $\bar{x} = 114.9$ $S_x = 9.3$ $n = 27$ $df = 26$

St. error = $S_{\bar{x}} = \frac{S_x}{\sqrt{n}} = \frac{9.3}{\sqrt{27}} = 1.7898$

In repeated sampling, the ave distance between the sample means and the pop. mean will be about 1.7898 units.

* (63) ② $n = 20$

$\bar{x}: 18.48$

* $S_x: 3.1158$

$\sigma_x: 3.0369$

95% $df = 19$

③ $t = 2.093$

① Random: yes, random sample

Normal?: histogram does not show outliers or skewness. So it is Normal

Indep: ~~po~~ sample is less than 10% of total possible samples.

④ ~~$\bar{x} \pm 2.093 \cdot \frac{3.1158}{\sqrt{20}}$~~

$\bar{x} \pm t \cdot \frac{S_x}{\sqrt{n}}$

$18.48 \pm 2.093 \left(\frac{3.1158}{\sqrt{20}}\right)$

18.48 ± 1.4582

$(17.022, 19.938)$

⑤ We are 95% confident that the interval from 17.022 to 19.938 captures the true mean mpg for this car.

Stats CH 8-3 E 65, 67, 71, 73, 75-78

(65) 99% conf.

$n=58$ $df=57$

$t = 2.665$

(67) $n=47$ $df=46$

$\bar{x} = -3.587\%$

$S_x = 2.506$

99% conf.

$t = 2.687$

$\bar{x} \pm t \cdot \frac{S_x}{\sqrt{n}}$

$-3.587 \pm 2.687\left(\frac{2.506}{\sqrt{47}}\right)$

$-3.587 \pm .982$

-4.569 to -2.605

Random - yes

Normal - $n \geq 30$ yes

Indep - $10n < N$ yes

We are 99% confident that the interval -4.569 to -2.605 captures the true mean percent change in calcium levels.

b) Yes - the entire interval is negative.

(71) $n=20$ $df=19$

We should NOT use a t-dist because there appears to be outliers.

(73)

a) NO - this is a proportion

b) NO - not random

c) NO - sample size less than 30, and there are outliers

(75) B

(76) $n=23$ $df=22$

Conf = 98%

A $t = 2.508$

(77) B want low conf and high sample size

(78) $n=24$

$C = 95\%$

$\mu = 80.2$ to 89.8

A

D possible but 24 is close to 30