$N = 5400$

$n = 400$

z-BASED CI

1. A random sample of 400 hospital admissions from a week's total of 5400 finds 88 were emergency contacts. Give a 98% confidence interval for p = rate of emergency contacts among admissions.

t-TABLE

DF		
∞	1.96	2.326
Conf	95%	98%

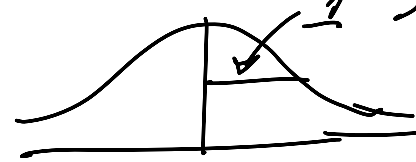
LARGE n →

$$\hat{p} = \frac{88}{400} = \frac{22}{100} = 0.22$$

$$\hat{p} \pm Z \frac{\sqrt{\hat{p}\,(1-\hat{p})}}{\sqrt{n}} \sqrt{\frac{N-n}{N-1}}$$

$$\sqrt{\frac{5400-400}{5400-1}} \approx 1$$

TABLE OF STD NORMAL



1 SD Z

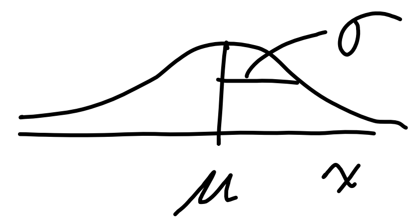
0

98% CI for p: $\hat{p} \pm z \frac{\sqrt{\hat{p}\hat{q}}}{\sqrt{n}} (1)$

$.22 \pm 2.326 \frac{\sqrt{.22 \cdot .78}}{\sqrt{400}} (1)$ FPC ~ 1

$$\hat{p} = \frac{88}{400} = .22$$

$n = 36$



all elk in popn

2. A random sample of 36 elk selected from the Jackon, Wy. Elk Refuge in winter are scored for x = lead exposure finding

sample mean $\overline{x} = 27.6$

sample standard deviation s = 11.4

It is believed that x scores in this winter herd are **normal distributed**. Give the 80% confidence interval for population mean lead exposure μ.

NORMAL POPN ENABLES t-BASED C.I.

EVEN FOR $n=2$!!

DF	
35	1.306
∞	
Conf	80%

$$\overline{x} \pm t \frac{s}{\sqrt{n}} \quad (1)$$

$$27.6 \pm 1.306 \frac{11.4}{\sqrt{36}}$$

NO FPC

IN CONTEXT OF t WE DO NOT USE FPC

$35 = n - 1 = 36 - 1$

$$\bar{x} \pm t \frac{\sigma}{\sqrt{n}}$$

EST'D SD OF LIST OF ALL $\bar{X}$

for 95% CI: $\bar{x} \pm 2.03 \frac{\sigma}{\sqrt{n}}$

EST'D MARGIN OF ERROR OF $\bar{X}$

3. What does **estimated margin of error of $\overline{x}$** actually estimate?

population sd σ
sd of the list of all possible $\overline{x}$
1.96 σ
1.96 sd of the list of all possible $\overline{x}$

for E MOE

EST OF SD OF LIST OF ALL POSSIBLE $\overline{X}$

4. We have obtained **estimated standard errors** for rates of cracking of concrete

$$0.037 \text{ for } \hat{p}_{\text{mixes with latex}}$$

$$0.042 \text{ for } \hat{p}_{\text{mixes without latex}}$$

Give the **estimated margin of error** for $\hat{p}_{\text{latex}} - \hat{p}_{\text{no latex}}$.

$$1.96\sqrt{0.037^2 - 0.042^2}$$

$+$

MOE

ASIDE

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

$$\boxed{\text{EST}^{\text{D}} \text{ STD ERROR OF } \hat{p}_{\text{LATEX}}} = \frac{\sqrt{\hat{p}_{\text{LATEX}}(1-\hat{p}_{\text{LATEX}})}}{\sqrt{n}} = \boxed{.037}$$

ALSO EST^{D} S.E. OF $\hat{p}_L - \hat{p}_{NL}$ IS $\sqrt{\frac{\hat{p}_L(1-\hat{p}_L)}{n_L} + \frac{\hat{p}_{NL}(1-\hat{p}_{NL})}{n_{NL}}}$

ROOT OF SUM OF SQUARES

THEN FOR EST^{D} MOE OF $\hat{p}_L - \hat{p}_{NL}$ TACK ON 1.96

5. We have obtained **estimated standard errors** for sample means of concrete hardness

$$0.037 \text{ for } \overline{x}_{\text{mixes with latex}}$$
$$0.042 \text{ for } \overline{x}_{\text{mixes without latex}}$$

Give the **estimated margin of error** for $\overline{x}_{\text{latex}} - \overline{x}_{\text{no latex}}$.

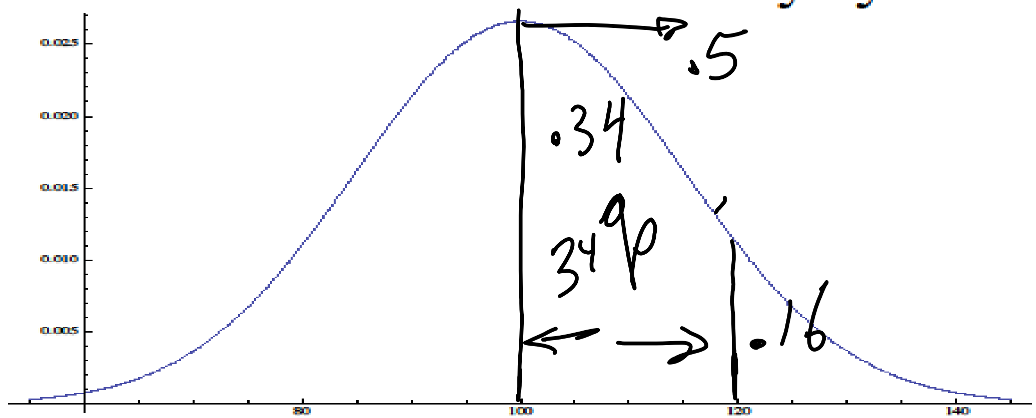
NEEDED FOR EMOE

$$1.96\sqrt{0.037^2 + 0.042^2}$$

$\bar{x}_L$ EST OF HARDNESS $\bar{x}_{NL}$

EST'D STD ERROR OF $\bar{x}_L - \bar{x}_{NL}$ IS $\sqrt{0.037^2 + 0.042^2}$

6. Estimate the mean and sd by eye.



100 120

MEAN IS AT 100

APPEARS SD = 120-100 gap = 20

7. Amount of genetic material in a given plot is normal distributed with

$\mu = 9 \qquad \sigma = 3$

Determine the standard score z of a plot with score x = 10.5.

$$z = \frac{x-\mu}{\sigma} \overset{\text{STD}}{\underset{\text{SCORE}}{=}} \frac{10.5-9}{3} = \frac{1.5}{3} = .5$$

Determine the amount x of genetic material of a plot with standard score z = 2.5.

PLOT W/ $z = 2.5 = \frac{x-9}{3}$

SOLVE $x = \mu + z\sigma = 9 + 2.5(3) = 16.5$

8. What is the **exact chance** that a 95% confidence interval for μ will in fact cover μ if the population is normal distributed and the t-CI is used?

.95

9. Use the z-table to determine
$P(Z < 2.43)$.

z	0.03
2.4	0.9925

ANS $P(Z < 2.43) = .9925$

$z = 1.08$ CODED 1.0 .08

10. Determine the **86th percentile of Z.**

z	0.08
1.0	0.8599

ANS $z = 1.08$

IQ is normal distributed and has mean 100 and sd 15. Determine the **86th percentile of IQ.**

$$IQ = 100 + z\,15 \quad = 100 + 1.08(15)$$

NOW 86TH PERCENTILE OF IQ

11. Determine the 86th percentile of Z.
Calculate the sample standard deviation s for the list x = {0, 0, 4, 8}.

avg = 12/4 = 3

$$s_x = \sqrt{\frac{(0-3)^2+(0-3)^2+(4-3)^2+(8-3)^2}{4-1}} = 3.82971$$

$$s_{4x+\cancel{9}} = |4|\, s_x = 4\,(3.82971)$$

DOES NOT CHANGE

12. We've selected random samples of people with or without medication, the score being x = blood pressure decrease over a 5 minute period. Assume large populations. No FPC

$\overline{x}_{\text{with med}} = 12.3$ $s_{\text{with med}} = 3.2$ n = 60

$\overline{x}_{\text{without med}} = 3.7$ $s_{\text{with med}} = 1.2$ n = 90

Give the 95% CI for $\mu_{\text{with med}} - \mu_{\text{without med}}$.

$$(12.3 - 3.7) \pm 1.96 \sqrt{\frac{3.2^2}{60} + \frac{1.2^2}{90}}$$