

Panel 1

Confidence Interval about μ

- Find S/\sqrt{N} (standard error)
- Multiplicator

90%	: 1.645	$\cdot S/\sqrt{N}$	} one of them
95%	: 1.96	$\cdot S/\sqrt{N}$	
99%	: 2.54	$\cdot S/\sqrt{N}$	
- Answer:

from	$\bar{x} - \#$	to	$\bar{x} + \#$
or	$\bar{x} \pm \#$	with	90% 95% 99% certain!

Panel 2

Quiz Review

$\wedge P(X \geq 42) = \underline{0.202}$ [X in $N(37, 6)$]

$\forall P(X \leq x_0) = \underline{0.634}$ [X in $N(10, 3)$]
 $\hookrightarrow x_0 = \underline{11}$

MSNBC wants to find avg. age of its viewers. They poll 200 viewers and find $\bar{x} = 35$ and $s = 7$ years. Find 95% confidence interval about the population mean, i.e. the avg. age of all viewers

① std. error $\cdot S/\sqrt{N} = \frac{7}{\sqrt{200}} = \underline{0.49}$

② $1.96 \cdot 0.49 = 0.97$ ③ Avg. age is 35 ± 0.97 or
 is from 34.03 to 35.97 years

Panel 3

Name: _____

Quiz

① If z is standard normal, find
 $P(z \geq 1.75)$

② If X is $N(70, 16)$, find
 $P(X \leq 80)$

③ If X is $N(4, 2)$, find x_0 such that
 $P(X \geq x_0) = 0.05$

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Panel 4

④ To measure the avg. pollution of the Hudson River, a scientist takes 150 measurements with a sample mean $\bar{x} = 237$ and $s = 3.8$. Find a 95% confidence interval about the unknown population mean μ .

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Panel 5

Is 90% or 99% bigger?

99% is widest (to catch more possible μ)

90% is shortest

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Panel 6

Central Limit Theorem: Say we have a distribution of unknown shape. If we select samples of size N and compute the sample mean \bar{X} , they will have a normal dist.

If original distribution has mean μ and std dev. σ , then the \bar{X} are normal with mean μ and $\frac{\sigma}{\sqrt{N}}$

$$\bar{X} \text{ are } N\left(\mu, \frac{\sigma}{\sqrt{N}}\right)$$

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Panel 9

The lifetimes (in years) of ten automobile batteries of a particular brand are:
 2.4 1.9 2.0 2.1 1.8
 2.3 2.1 2.3 1.7 2.0
 Estimate the mean lifetime for all batteries, using a 95% confidence interval.

Want: 95% conf. interval

Need: $\bar{x} = 2.06$

$s = 0.22$

std. error $\frac{s}{\sqrt{n}} = \frac{0.22}{\sqrt{10}} = 0.0711$

multiply

~~if $n \geq 30$~~ 196
 $P(x > x_0) = 0.025$, $df = n - 1 = 9 \Rightarrow [2.16]$

$\bar{x} \pm \text{mult.} \cdot \text{std. error}$
 $2.06 \pm 2.16 \cdot 0.0711 = 0.1622$

2.06 ± 0.1622

Panel 10

Topics for Exam 2

Cont. tables: row/col %, expected values, p-value of Chi-Square test, 'rule of 5'

Linear Regression: corr. coeff, scatter plot, regression line, prediction

Probability: dice, cards, flip coin, $N(\mu, \sigma)$,
 T_{df} : $P(x > t) = \#$

Confidence intervals
 $n \geq 30$
 $n < 30$