# Statistics
# Spring 2023
# Lecture 40

Feb 19-8:47 AM

## Estimating Population Mean

$\mu$

Conf. Interval $\bar{x} - E < \mu < \bar{x} + E$

$\bar{x}$: Sample Mean, "Point-estimate"

$E$: Margin of error

### Case I: $\sigma$ Known

$E = z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$

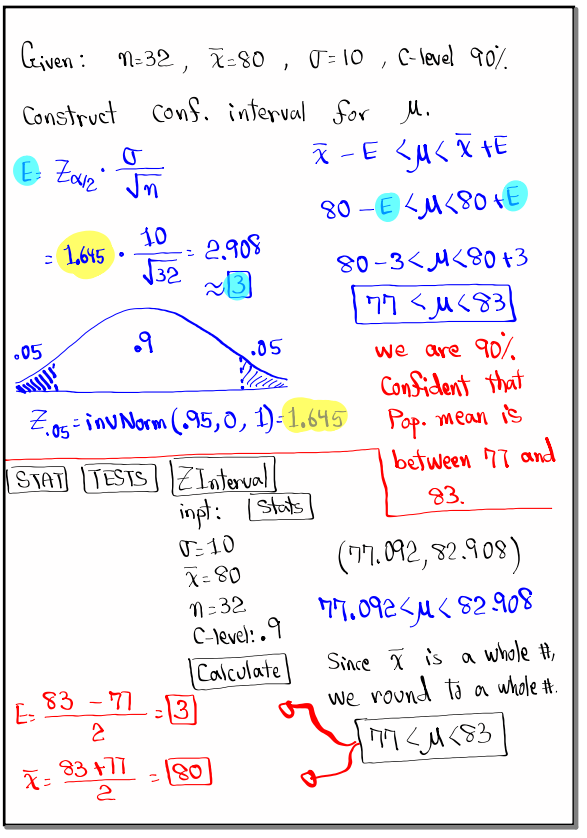
$(1-\alpha) \cdot 100\%$ C-level

TI Command:

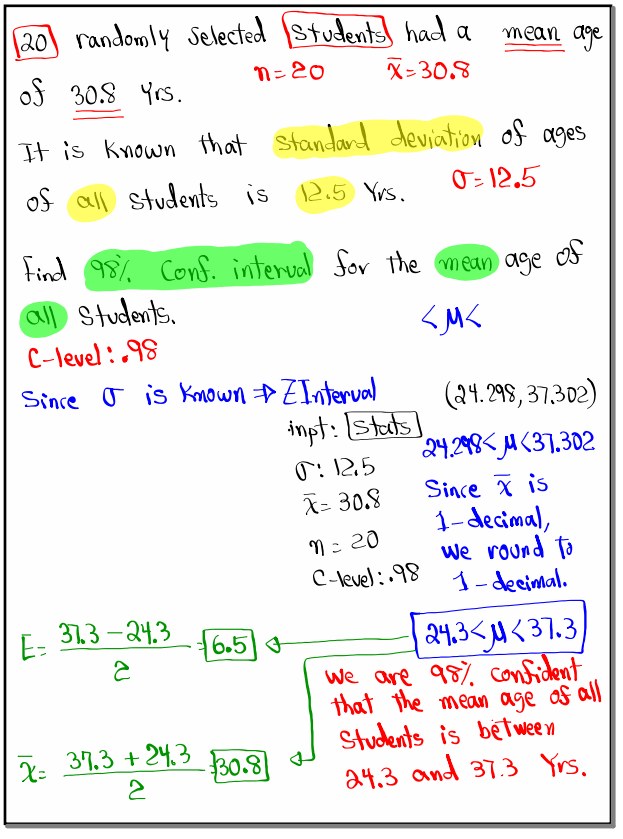
ZInterval

input: Stats

Apr 26-7:16 AM




Apr 26-7:20 AM




Apr 26-7:33 AM

15 randomly selected nurses had the following monthly Salaries:

| | | | | |
|---|---|---|---|---|
| 6200 | 6250 | 6400 | 7000 | 5800 |
| 5950 | 6000 | 6800 | 7200 | 6950 |
| 4800 | 5000 | 6000 | 7000 | 7500 |

1) Find $\bar{x}$, Round to whole #

$\bar{x} = 6323$

2) Assume Standard deviation of Salaries of all nurses is \$850, find 99% Conf. interval for mean Salaries of all nurses.

$\sigma = 850$ $\quad < \mu <$

C-level: .99

Since $\sigma$ is Known $\Rightarrow$ Z Interval $\quad (5757.7, 6888.3)$

$E = \frac{6888 - 5758}{2} = 565$

$\bar{x} = \frac{6888 + 5758}{2} = 6323$

inpt: Stats

$\sigma$: 850 $\quad 5757.7 < \mu < 6888.3$

$\bar{x} = 6323 \rightarrow$ whole #

$n = 15$

C-level: .99

Calculate

$5758 < \mu < 6888$

Apr 26-7:43 AM

25 randomly selected exams had a mean score of 84.5.

$n = 25$ $\quad \bar{x} = 84.5$

Assume Standard deviation of scores of all exams is 18.2. $\quad \sigma = 18.2$

Find Confidence interval for the mean of all exams. $\quad < \mu <$

C-level not given $\rightarrow$ use .95

$\sigma$ is known $\Rightarrow$ Z Interval

$\bar{x}$ is one decimal $\Rightarrow$ Round to 1-decimal.

Z Interval

inpt: Stats

$\sigma$: 18.2

$\bar{x}$: 84.5

$n = 25$

C-level: .95

$77.4 < \mu < 91.6$

$E = \frac{91.6 - 77.4}{2} = 7.1$

$\bar{x} = \frac{91.6 + 77.4}{2} = 84.5$

Apr 26-7:56 AM

t - Dist.

1) Graph is Symmetric, bell-shape, with total area 1.

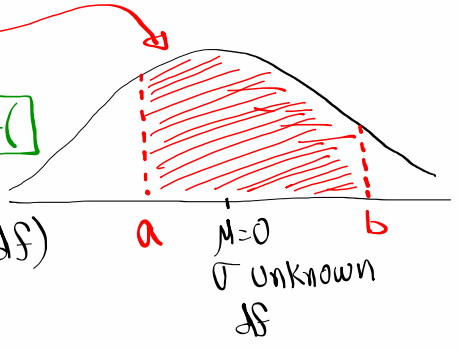
2) $\mu = 0$, $\sigma$ unknown

3) It comes with degrees of freedom.

$P(a < t < b)$

2nd VARS tcdf(

tcdf( Lower, Upper, df)

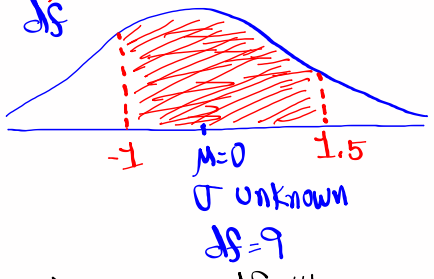



Apr 26-8:06 AM

Find $P(-1 < t < 1.5)$ with $df = 9$.

= tcdf(-1, 1.5, 9)
L U df

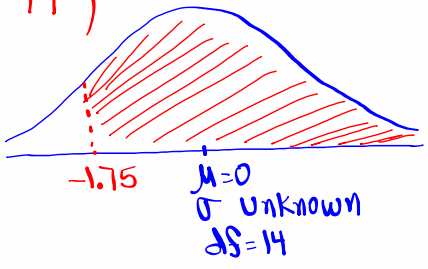
= .744




Find $P(t > -1.75)$ with $df = 14$.

= tcdf(-1.75, E99, 14)

= .949

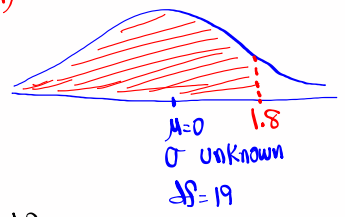



Apr 26-8:10 AM

Find $P(t < 1.8)$ with $df = 19$.

= tcdf(-E99, 1.8, 19)

= .956




Find $t_{.02}$ with $df = 12$.

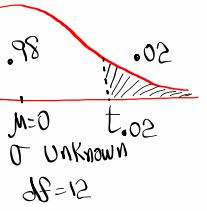
Right area

$t_{.02}$ = invT( Left Area, df)

.98 12

2nd VARS

= 2.303




If you don't have invT in your calc, download the app "WabbitEMU"

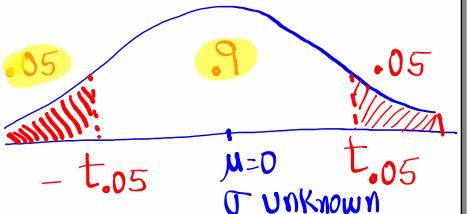
Apr 26-8:15 AM

Find $\pm t_{\alpha/2}$ for 90% C-level with $df = 19$

Middle area = .9

1 − .9 = .1 ← α

.1 ÷ 2 = .05 ← α/2




$t_{.05}$ = invT( .95, 19)

= 1.729

Exam II: Tuesday May 2, 2023

SG 1 – SG 21

You can arrive as early as 6:00 AM.

Apr 26-8:22 AM