Statistics

Lecture 22

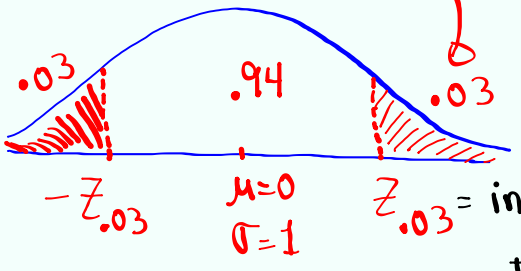
Feb 19-8:47 AM

Find $z_{.03}$.

$\alpha/2 = .03$

$\alpha = .06 \rightarrow$ Sig. level

$1 - \alpha = .94 \rightarrow 94\%$ C-level



$= \text{invNorm}(.97, 0, 1)$

-1.881 $= \boxed{1.881}$

Nov 19-10:38 AM

Find Conf. interval for the prop. of all voters that voted Yes on Prop. 50 if 62% of 350 randomly selected voters voted Yes on Prop. 50.

$\_\_ < p < \_\_$

No C-level → .95

$n = 350$, $\hat{p} = .62$ → $x = n\hat{p} = 350(.62) = 217$

if decimal → Round-up

Use 1-PropZInt

Since $\hat{p}$ is 2-decimals we round to 2-dec.

$E = \frac{.67 - .57}{2} = .05$

$\hat{p} = \frac{.67 + .57}{2} = .62$

$.57 < p < .67$

Nov 19-10:43 AM

How many voters should we select if we want 99% Conf. interval and error not exceed 4%?

$n = \hat{p}\hat{q}\left(\frac{z_{\alpha/2}}{E}\right)^2 = (.62)(.38)\left(\frac{2.576}{.04}\right)^2$

$= 977.118\ldots$

$n \approx 978$

$z_{.005} = \text{invNorm}(.995, 0, 1) = 2.576$

Assume $\hat{p}$ & $\hat{q}$ were unknown, $\hat{p} = .5$, $\hat{q} = .5$

$n = .25\left(\frac{z_{\alpha/2}}{E}\right)^2 = .25\left(\frac{2.576}{.04}\right)^2 = 1036.84$

$n \approx 1037$

Nov 19-10:50 AM

A Sample of 32 teachers had a mean age of 45.8 years.

$n = 32$, $\bar{x} = 45.8$

No C-level → .95

Find Conf. interval for the mean age of all teachers if Standard deviation of ages of all teachers is 12.5 yrs.

$\sigma = 12.5$

$41.5 < \mu < 50.1$

σ Known → Z Interval

inpt: Stats

Since $\bar{x}$ is 1-dec. → Round to 1-dec

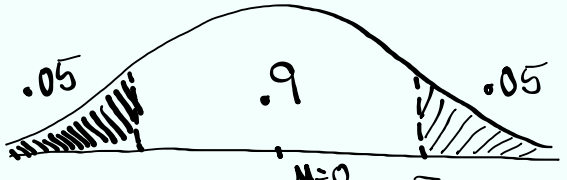
$E = \frac{50.1 - 41.5}{2} = 4.3$ $\quad \bar{x} = \frac{50.1 + 41.5}{2} = 45.8$

Nov 19-11:00 AM

How many teachers should we randomly Select to construct 90% - Conf. interval and error to be 5 yrs?

$$n = \left(\frac{z_{\alpha/2} \cdot \sigma}{E}\right)^2 = \left(\frac{1.645 \cdot 12.5}{5}\right)^2 = 16.91\ldots$$

$n \approx 17$



$z_{.05} = \text{invNorm}(.95, 0, 1) = 1.645$

Nov 19-11:08 AM

I randomly Selected 15 exams. Here are the Scores:

82	95	78	100	68
55	70	90	80	98
50	60	79	92	88

1) Find $\bar{x}$ & s. Round to 1-dec.

$\bar{x} = 79.0$ $\quad s = 15.6$

2) Find 99% Conf. interval for the mean of all exams.

C-level: .99

σ unknown → T Interval

inpt: Stats

$\bar{x} = 79.0$

$s = 15.6$

$n = 15$

C-level: .99

$67.0 < \mu < 91.0$

$E = \frac{91-67}{2} = 12$

$\bar{x} = \frac{91+67}{2} = 79$

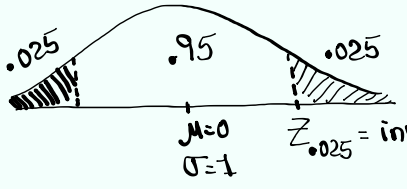
Nov 19-11:15 AM

How many exams should we randomly select to construct 95% Conf. interval and error to be within 8 pts.?

$n = \left(\frac{z_{\alpha/2} \cdot s}{E}\right)^2 = \left(\frac{1.960 \cdot 15.6}{8}\right)^2$

σ is unknown

$= 14.6\ldots$ $\quad n \approx 15$



$z_{.025} = \text{invNorm}(.975, 0, 1) = 1.960$

Redo with $E = 4$.

$n = \left(\frac{1.960 \cdot 15.6}{4}\right)^2 = 58.43\ldots$ $\quad n \approx 59$

Nov 19-11:24 AM

More on degrees of freedom:

Give me two numbers with Sum of 10.

4 → I can only pick 6.

8 → " " " " 2

↳ First number can be anything, Second number is fixed.

df = 1

Give me 3 numbers with Sum of 10.

2 & 3 → I have to pick 5.

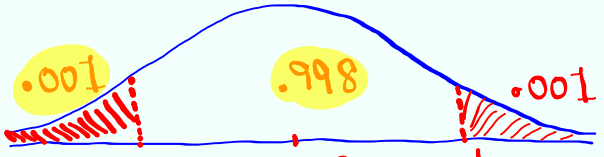
1 & 6 → " " " " 3

5 & 5 → " " " " 0

df = 2

Nov 19-11:33 AM

Find $t_{.001}$ with df = 29.



$-t_{.001}$ $\mu = 0$ $t_{.001}$ = invT(.999, 29)

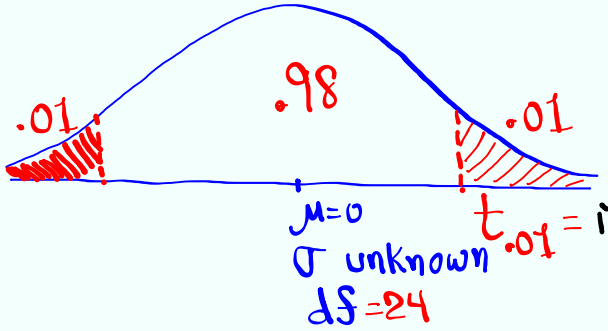
σ unknown

−3.396 df = 29 = 3.396

Nov 19-11:38 AM

Find $t_{\alpha/2}$ to construct 98% conf. interval for pop. mean with $n = 25$.

$df = n - 1 = 24$



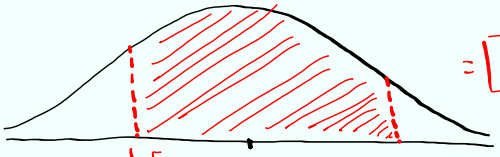
$t_{.01} = \text{invT}(.99, 24) = \boxed{2.492}$

Nov 19-11:43 AM

Find $P(-1.5 < Z < 1.8)$

$= \text{normalcdf}(-1.5, 1.8, 0, 1)$

$= \boxed{.897}$

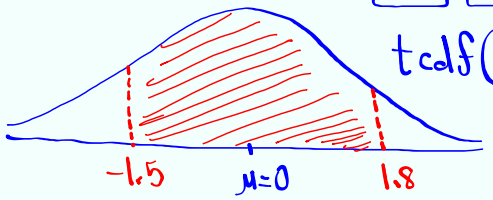


Find $P(-1.5 < t < 1.8)$ with $df = 999$.

2nd VARS

$\text{tcdf}(-1.5, 1.8, 999)$

↑ lower ↑ upper ↑ df

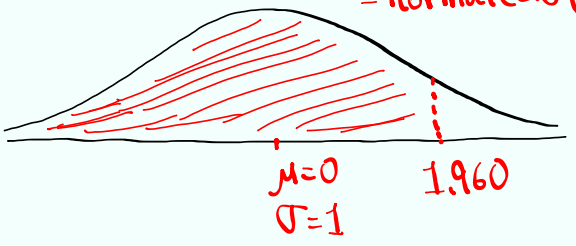


$= \boxed{.897}$

Nov 19-11:48 AM

Find $P(Z < 1.960)$

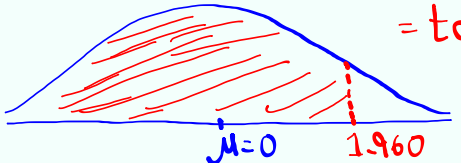
= normalcdf(−E99, 1.960, 0, 1)



= .975

Find $P(t < 1.960)$ with $df = 99$.

= tcdf(−E99, 1.960, 99)



σ unknown

df = 99

= .974

Redo with df = 999

tcdf(−E99, 1.960, 999) = .975

Nov 19-11:54 AM

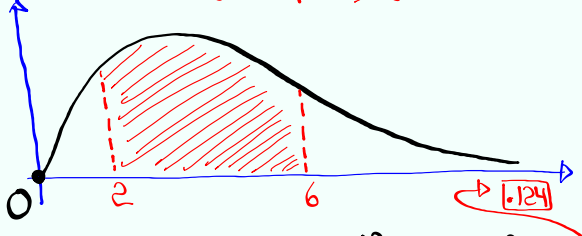
F – Dist.:

1) Graph begins at 0 and is Positively Skewed.

2) It is not symmetric but total Area is 1.

3) It has two degrees of freedom.

NDf & Ddf



Find $P(2 < F < 6)$ with NDf = 4 & Ddf = 25.

2nd VARS fcdf fcdf(2, 6, 4, 25) =

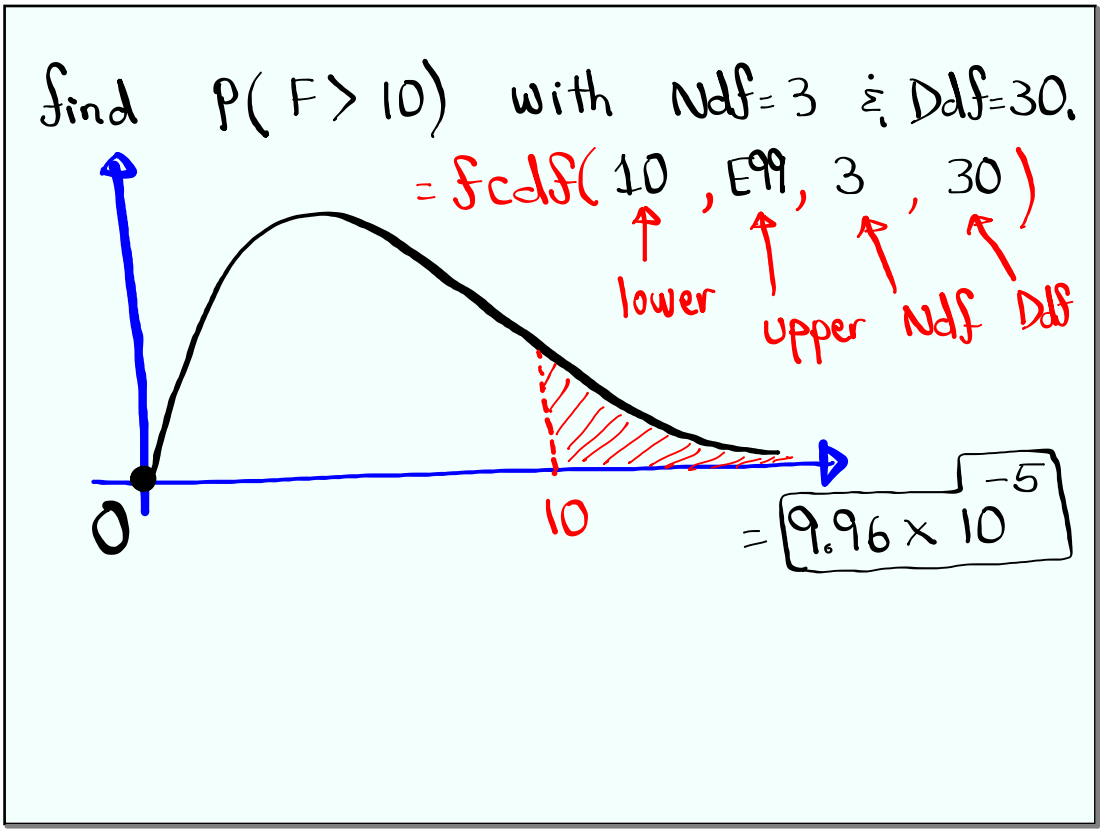
Lower

Upper

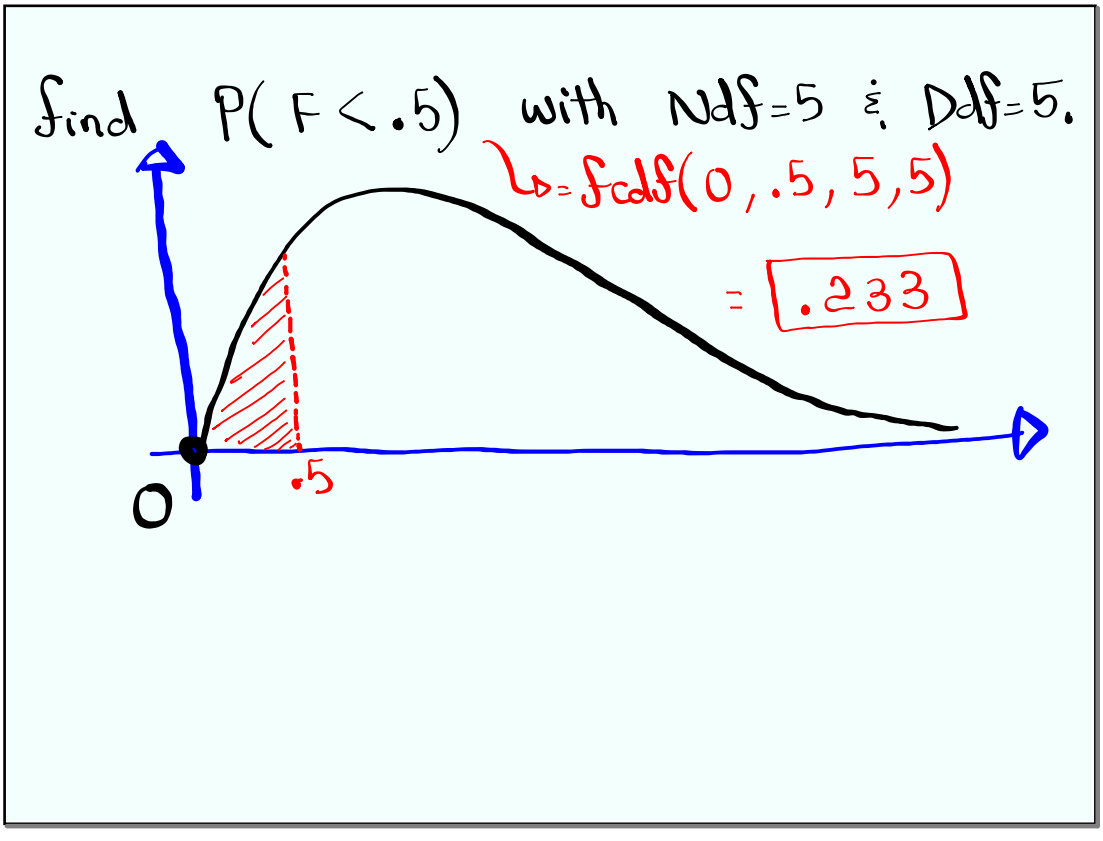
NDf

Ddf

Nov 19-12:02 PM



Nov 19-12:09 PM



Nov 19-12:13 PM