

Statistics

Lecture 19



Feb 19-8:47 AM

In a Survey of 400 adults, 275 of them
had active instagram Account.

$$n = 400$$

$$x = 275$$

find 98% Conf. interval for the prop of all
adults with active instgram acct.

STAT TESTS 1-PropZInt

$$.63 < P < .74$$

$$E = \frac{.74 - .63}{2} = .055$$

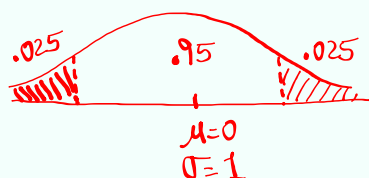
$$\hat{p} = \frac{.74 + .63}{2} = .685$$

May 11-1:47 PM

find min. number of adults if we wish to construct 95% Conf. interval and error not to exceed 4% and assuming

1) $\hat{p} = .685$

$$n = \hat{p}\hat{q} \left(\frac{Z_{\alpha/2}}{E} \right)^2$$



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

$$= (.685)(.315) \left(\frac{1.960}{.04} \right)^2 = 518.07 \dots \quad n \approx 519$$

2) \hat{p} & \hat{q} unknown

$$n = .25 \left(\frac{Z_{\alpha/2}}{E} \right)^2 = .25 \left(\frac{1.960}{.04} \right)^2 = 600.25 \quad n \approx 601$$

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$n = 155$

$\hat{p} = .32 \rightarrow x = n\hat{p} = 155(.32) \approx \boxed{x=50}$

C-level: None \rightarrow use .95

1-Prop Z Int

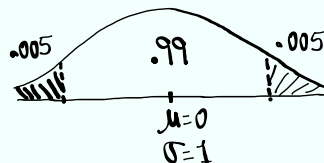
find min. Sample Size needed to construct 99% Conf. interval and error

$.24 < P < .41$

$$E = \frac{.41 - .24}{2} = \boxed{.085}$$

not to exceed 5% with $\hat{p} = .32$.

$$n = \hat{p}\hat{q} \left(\frac{Z_{\alpha/2}}{E} \right)^2 = (.32)(.68) \left(\frac{2.576}{.05} \right)^2$$



$$= 577.577943$$

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

$n \approx \boxed{578}$

May 11-2:08 PM

Given $n=35$, $\bar{x}=77.5$, $\sigma=8.2$

Find 90% Conf. interval for pop. mean.

σ Known \rightarrow Z Interval inpt: Stats

σ Unknown \rightarrow T Interval

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

$75.2 < \mu < 79.8$

$E = \frac{79.8 - 75.2}{2} = 2.3$

Find min. Sample Size needed for 98% C-level for pop. mean and error not to exceed 5 pts

$n = \left(\frac{Z_{\alpha/2} \cdot \sigma}{E} \right)^2$

$= \left(\frac{2.326 \cdot 8.2}{5} \right)^2$

$= 14.551$ ($n=15$)

$Z_{.01} = \text{invNorm}(.99, 0, 1)$

May 11-2:19 PM

Given: $n=20$, $\bar{x}=135$, $S=15$

Find 99% Conf. interval for pop. mean.

σ Known \rightarrow Z Interval inpt: Stats

σ Unknown \rightarrow T Interval

$125 < \mu < 145$

Find min. Sample Size needed to construct 90% Conf. interval for pop. mean and error be within 5 pts.

$E = \frac{145 - 125}{2} = 10$

$n = \left(\frac{Z_{\alpha/2} \cdot \sigma}{E} \right)^2 = \left(\frac{Z_{\alpha/2} \cdot S}{E} \right)^2 = \left(\frac{1.645 \cdot 15}{5} \right)^2$

$= 24.354$

$n \approx 25$

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

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Here are the ages of 10 randomly selected doctors in the area:

48	52	65	55	45	$\bar{x} = 52$	} Round to whole #
40	50	60	70	30	$S = 12$	

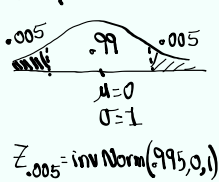
Find Conf. interval for the mean age of all doctors in the area.

σ known \rightarrow Z Interval $43 < \mu < 61$

σ Unknown \rightarrow T Interval $E = \frac{61 - 43}{2} = 9$

Find min. # of doctors we need to survey to be 99% Conf. $\hat{\epsilon}$ error not to exceed 8 yrs.

$n = \left(\frac{Z_{\alpha/2} \cdot S}{E} \right)^2 = \left(\frac{2.576 \cdot 12}{8} \right)^2 = 14.93 \dots$ $n \approx 15$



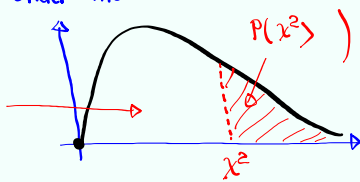
$Z_{.005} = \text{invNorm}(.995, 0, 1)$

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Chi-Square Dist.

χ^2 - Dist.

- Graph begins at 0, and it is positively skewed.
- It comes with df.
- Total area under the curve is 1.

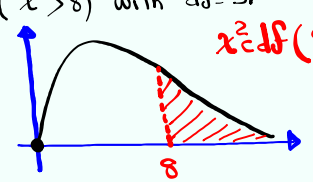


To find it:

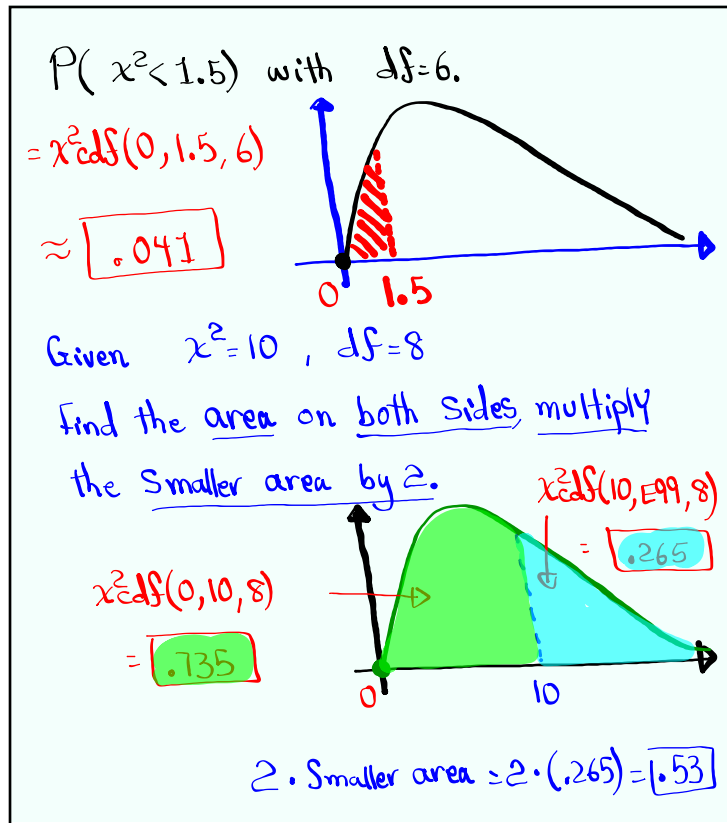
2nd VARS χ^2 df (L, U, df)

$P(\chi^2 > 8)$ with $df = 5$.

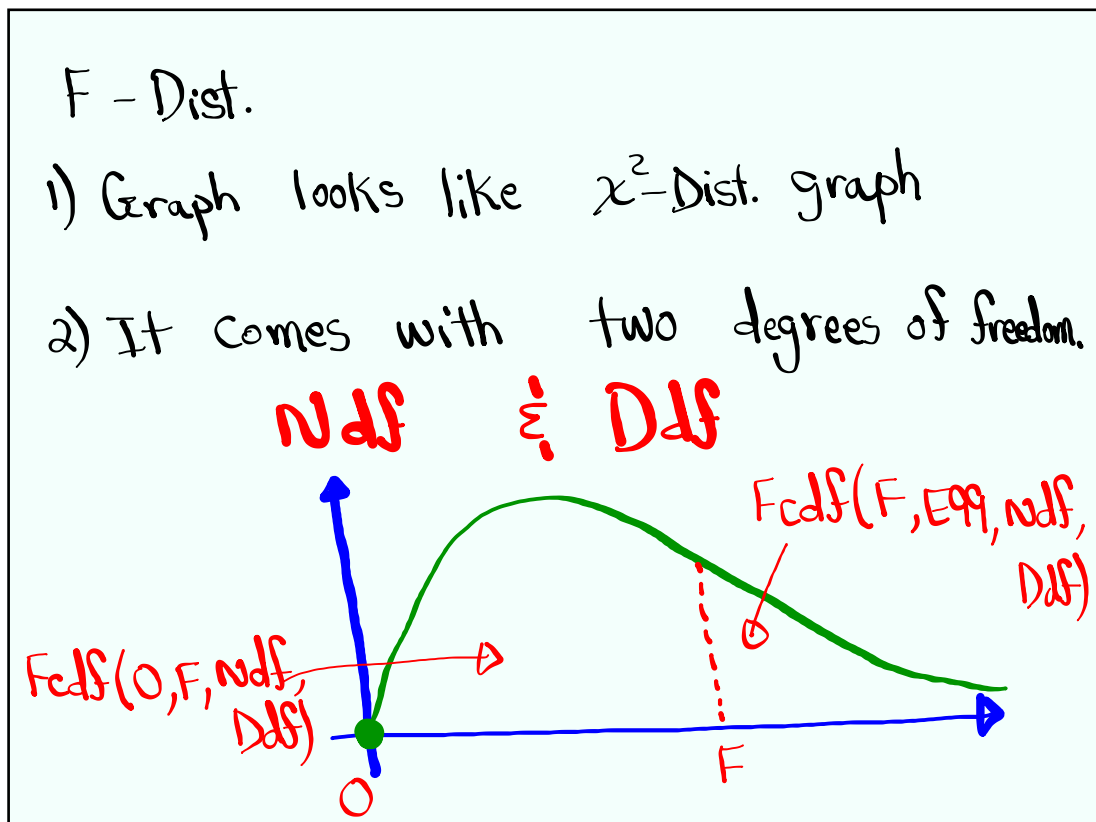
χ^2 df (8, .99, 5) $\approx .156$



May 11-3:00 PM



May 11-3:08 PM

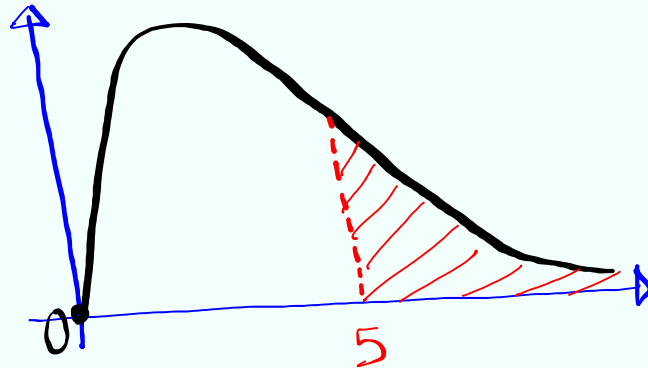


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Find $P(F > 5)$ with $\text{ndf} = 4$, $\text{Ddf} = 15$.

$$f_{cdf}(5, F99, 4, 15)$$

$$\approx \boxed{.009} \checkmark$$

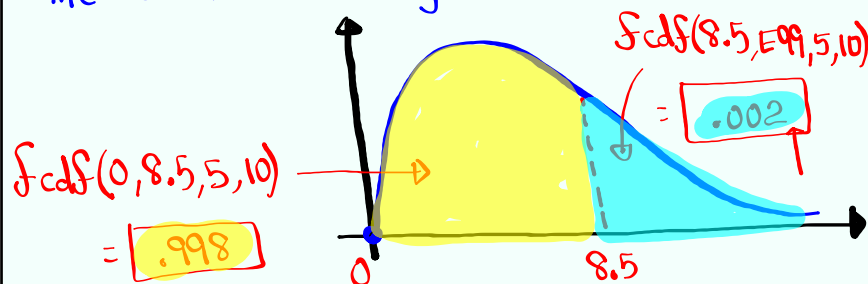


$$P(F < 5) = f_{cdf}(0, 5, 4, 15) \approx \boxed{.991} \checkmark$$

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Given $F = 8.5$ $\text{ndf} = 5$, $\text{Ddf} = 10$

Find the area on both sides, multiply the smaller area by 2.



$$2 \cdot \text{Smaller} = 2(.002)$$

$$= \boxed{.004}$$

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