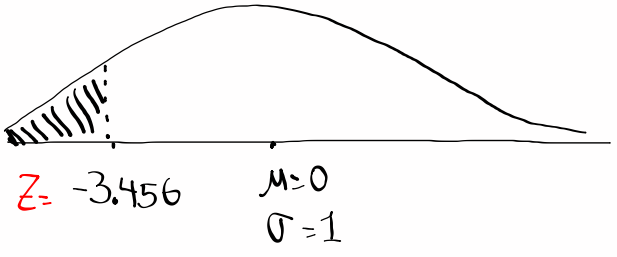
Statistics
Spring 2023
Lecture 42

Feb 19-8:47 AM

Find twice the area shaded below.



Since $\mu=0$, and $\sigma=1$

$\Rightarrow$ we are working with $N(0,1)$

Standard Normal Prob. Dist.

$2 * \text{normalcdf}(-E99, -3.456, 0, 1)$

$= 5.484 \times 10^{-4}$

May 1-7:15 AM

Find $z_{\alpha/2}$ for $\alpha = .06$

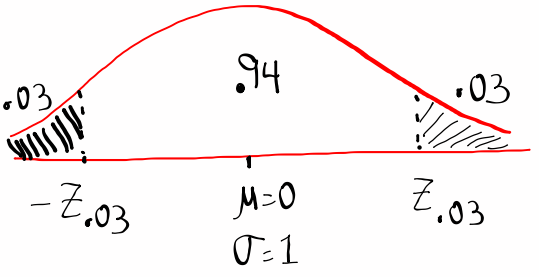
$\alpha/2 = .06/2 = .03$ ← Area on each tail

$(1-\alpha)\cdot 100\% = 94\%$ ← Conf. level

$1-\alpha = .94$ ← Area in the middle

$z_{.03} = \text{invNorm}(.97, 0, 1)$

$= \boxed{1.881}$



May 1-7:19 AM

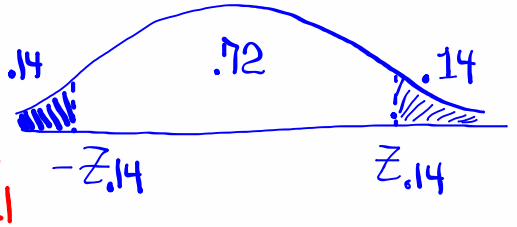
Find $\pm z_{\alpha/2}$ for 72% C-level.

Middle Area .72

$1-\alpha = .72$

$\alpha = .28$

$\alpha/2 = .14$ ← Area on each tail



$z_{.14} = \text{invNorm}(.86, 0, 1) = \boxed{1.080}$

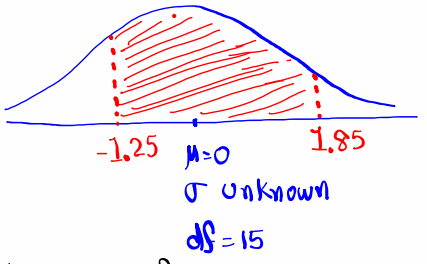
May 1-7:23 AM

Find the area between $t=-1.25$ and $t=1.85$ with $df=15$.

$P(-1.25<t<1.85)$

$= tcdf(-1.25, 1.85, 15)$

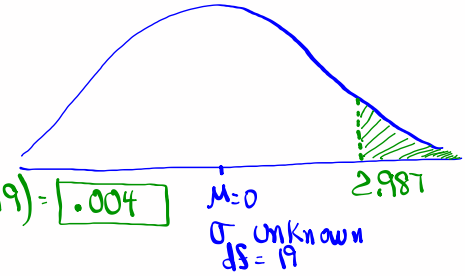
$= .843$



Find the area to the right of $t=2.987$ with $df=19$.

$P(t>2.987) =$

$tcdf(2.987, E99, 19) = .004$



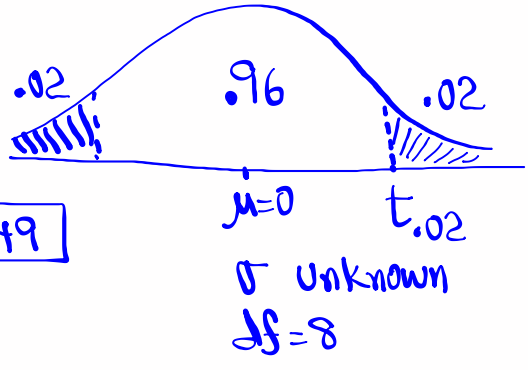
May 1-7:26 AM

Find $t_{\alpha/2}$ for $\alpha=.04$ with $df=8$.

$\alpha/2 = .02$

$1-\alpha = .96$

$t_{.02} = invT(.98, 8) = 2.449$

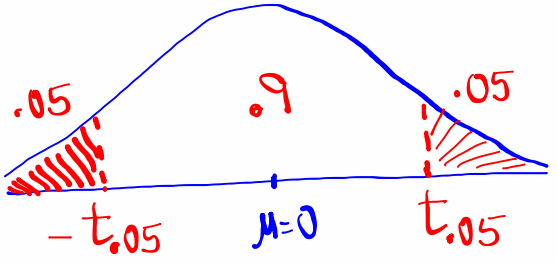


May 1-7:33 AM

Find $\pm t_{\alpha/2}$ for 90% C-level & df = 999

$t_{.05}$ = invT(.95, 999)

= 1.646



σ unknown

df = 999

As df increases, $t_{\alpha/2} \approx z_{\alpha/2}$

May 1-7:36 AM

χ^2 - Dist.

↑ chi-square

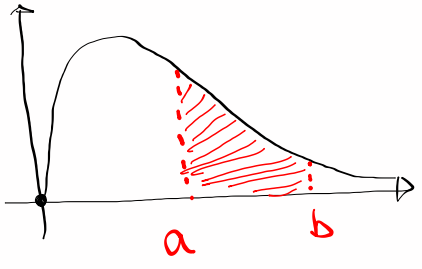
1) Graph begins at 0, and skewed to the right.

2) It is not symmetric. It is not bell-shape. It has total Area = 1

3) χ^2-Dist. comes with df.

$P(a < \chi^2 < b) =$

$\chi^2 cdf(L, U, df)$

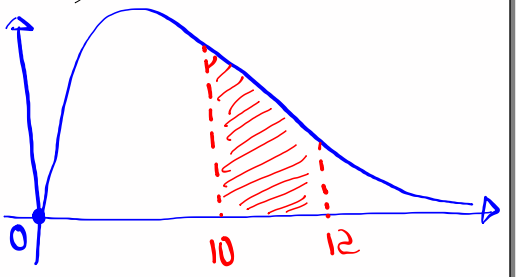


May 1-7:40 AM

Find $P(10 < \chi^2 < 12)$ with $df = 8$.

$= \chi^2 cdf(10, 12, 8)$

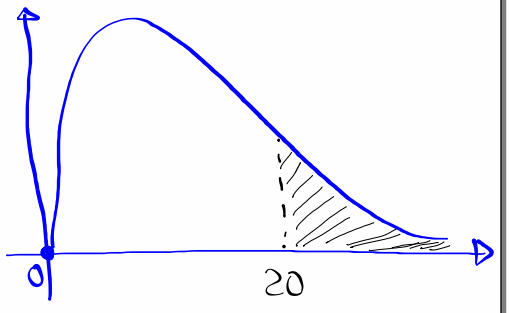
$= .114$



Find $P(\chi^2 > 20)$ with $df = 9$.

$\chi^2 cdf(20, E99, 9)$

$= .018$

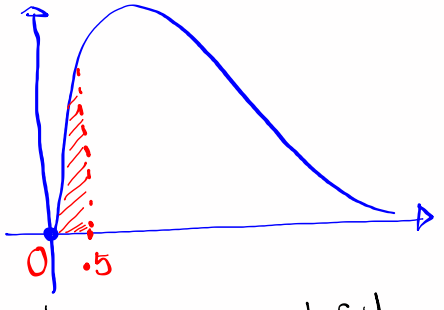


May 1-7:44 AM

Find $P(\chi^2 < .5)$ with $df = 5$.

$\chi^2 cdf(0, .5, 5)$

$= .008$



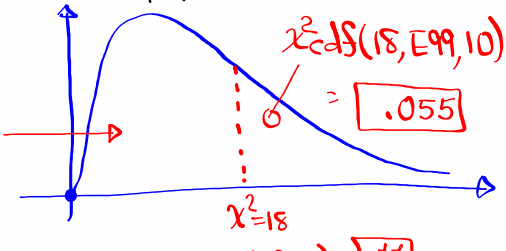
with $df = 10$, find the area on each side of $\chi^2 = 18$, then multiply the smaller area by 2.

$\chi^2 cdf(0, 18, 10)$

$= .945$

$\chi^2 cdf(18, E99, 10)$

$= .055$



2 * Smaller area $= 2(.055) = .11$

May 1-7:49 AM

F-Dist.

1) Graph is similar to χ^2 Dist.

2) It comes with two degrees of freedom.

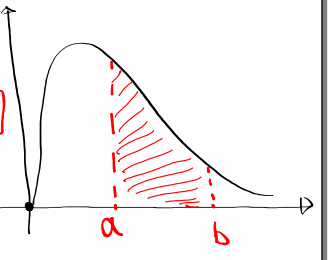
Numerator df → Ndf

Denominator df → Ddf

P(a < F < b)

2nd VARS ↓↓↓... fcdf

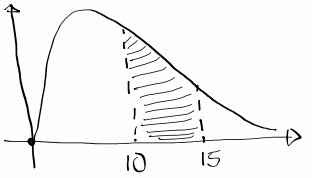
Fcdf(L, U, Ndf, Ddf)



Find P(10 < F < 15) with Ndf=5, Ddf=30.

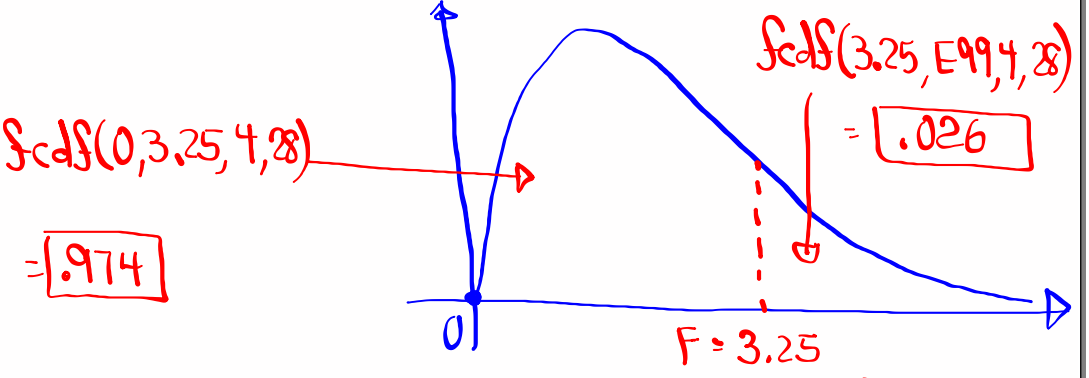
= fcdf(10,15,5,30)

= 1.028×10^{-5}



May 1-7:58 AM

Given Ndf = 4, Ddf = 28, find the area on each side of F = 3.25, then multiply the smaller area by 2.



2 * Smaller area = 2(.026) = .052

May 1-8:05 AM

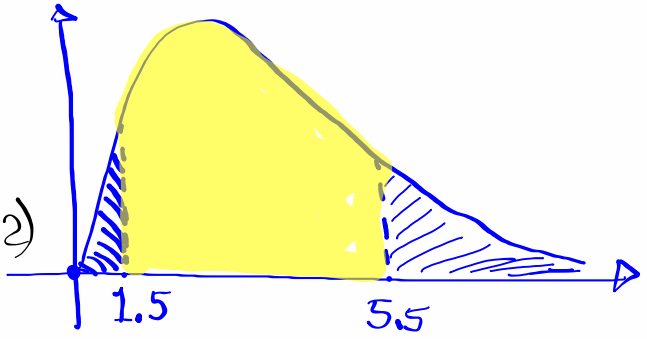
Find $P(F<1.5 \text{ OR } F>5.5)$ with

$Ndf = 4$ & $Ddf = 32$.

$= 1 - P(1.5<F<5.5)$

$= 1 - \text{Fcdf}(1.5, 5.5, 4, 32)$

$= .776$



Exam II: Thursday May 4th, 2023

May 1-8:10 AM