Statistics

Lecture 20

Feb 19-8:47 AM

Exam Scores are normally dist. with the mean of 86 and standard dev. of 5.

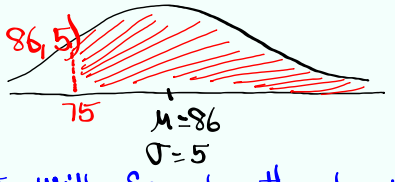
$N(86, 5)$

If we randomly select one exam, find the prob. that is above 75.

$P(x > 75)$

= normalcdf(75, E99, 86, 5)

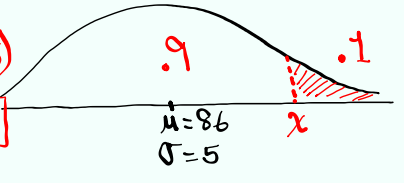
= .786



find the Score that will Separte the top 10% from the rest.

x = invNorm(.9, 86, 5)

= 92.408 ≈ 92



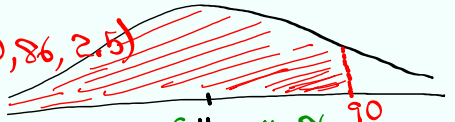
May 11-9:58 AM

If we randomly Select 4 exams ($n=4$), find the Prob. that their mean Scores ($\bar{x}$) is below 90.

$P(\bar{x} < 90)$

= normalcdf(-E99, 90, 86, 2.5)

$\approx$ .945

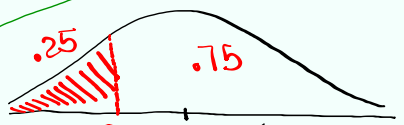


CLT $\begin{cases} \mu_{\bar{x}} = \mu = 86 \\ \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{5}{\sqrt{4}} = 2.5 \end{cases}$

Find $\bar{x} = Q_1$ for randomly Selected group of 4 exams

$\bar{x}$ = invNorm(.25, 86, 2.5)

$\approx$ 84



$\mu_{\bar{x}} = 86$

$\sigma_{\bar{x}} = 2.5$

May 11-10:09 AM

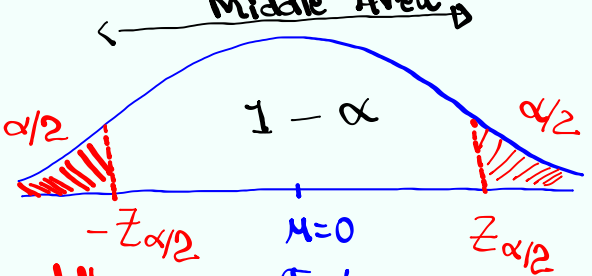
$z_{\alpha/2}$ ← $\alpha/2$ is the area of the right tail

Alpha

$0 < \alpha < 1$

Significance level

$1 - \alpha$ is the middle area. Confidence level



$\sigma = 1$

To find $z_{\alpha/2}$ we use invNorm

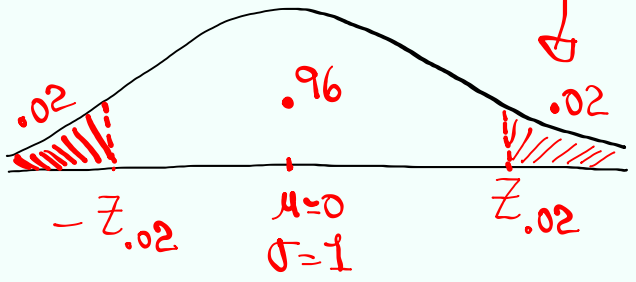
May 11-10:19 AM

Find $z_{.02}$

$\alpha/2 = .02$

$\alpha = .04$

$1 - \alpha = .96$



$z_{.02} = \text{invNorm}(.98, 0, 1) = \boxed{2.054}$

May 11-10:24 AM

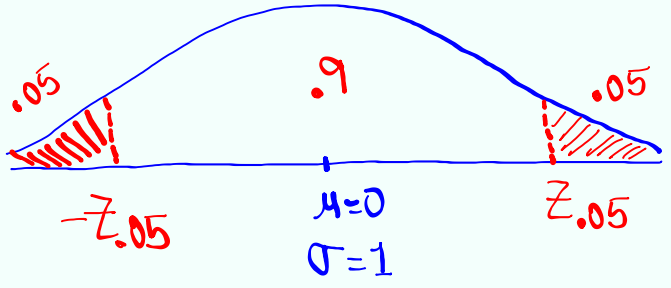
Find $\pm z_{\alpha/2}$ for Conf. level .9

Middle Area

$1 - \alpha = .9$

$\alpha = .1$

$\alpha/2 = .05$



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

$\approx \boxed{1.645}$

May 11-10:29 AM

t - Dist.

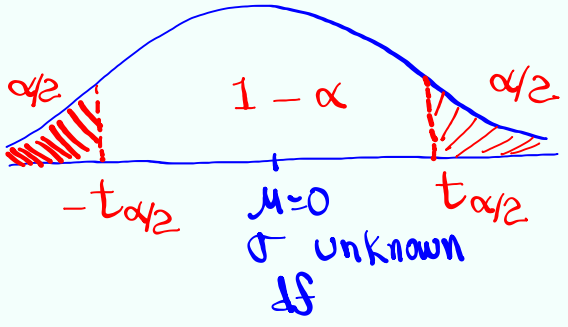
1) Symmetric, Bell-Shape, total area = 1

2) $\mu = 0$ but σ unknown

3) It comes with degrees of freedom df.

How to find $t_{\alpha/2}$

2nd | VARS | inv T(



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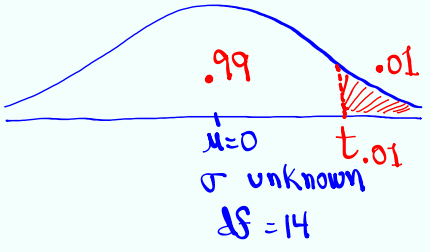
Find $t_{\alpha/2}$ for $\alpha = .02$ and $df = 14$.

$\alpha/2 = \frac{.02}{2} = .01$

$t_{.01} = \text{inv}T(.99, 14)$

$\approx \boxed{2.624}$



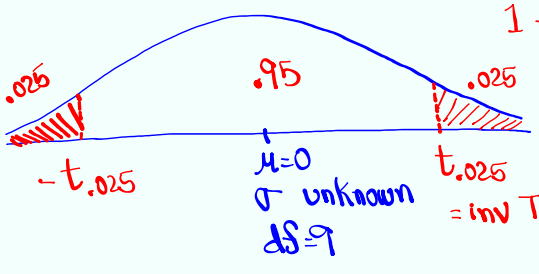
Find $\pm t_{\alpha/2}$ for 95% Conf. level, with df=9

Middle Area .95

$1 - \alpha = .95$

$\alpha = .05$

$\alpha/2 = .025$



$t_{.025} = \text{inv}T(.975, 9) \approx \boxed{2.262}$

May 11-10:40 AM

What is degrees freedom?

# of free choices to choose from.

It will be given to us or determined by topics.

25 students, 25 donuts, you can have one donut.

First Student	"	25 choices
Second	"	24 "
Third	"	23 "
⋮		
Last	"	0 choice (1 donut)

df = 24

May 11-10:48 AM

Select 2 positive numbers with Sum of 10.

df = 1

Ricardo 5

Me I have to pick 5. 5+5=10

Select 3 positive numbers with Sum of 10.

df = 2

Ricardo 7

Victoria 3

me I have to pick 0

May 11-10:54 AM

F - Dist.

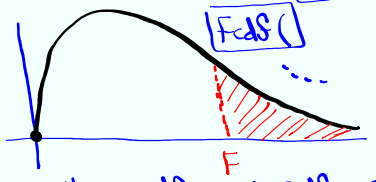
1) Graph begins at 0, and it skews to the right.

2) Total area = 1

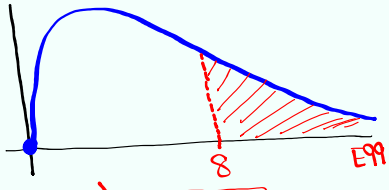
3) It comes with two df.

nDf & Ddf 2nd VARS

FcdF(



find P(F > 8) with nDf = 5 & Ddf = 10



= fcdf(8, E99, 5, 10) = .003

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