Statistics

Lecture 13

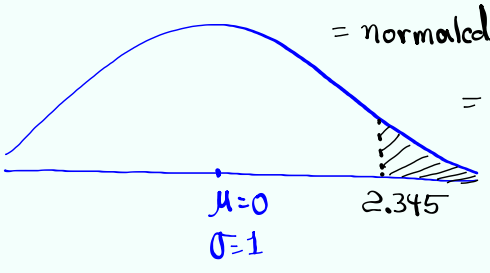
Feb 19-8:47 AM

SG 21
SG 22

Find $P(Z > 2.345)$

= normalcdf(2.345, E99, 0, 1)

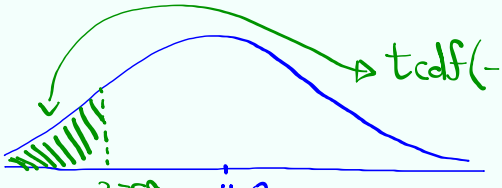
= .010



Find $P(t < -3.789)$ with $df = 11$.

tcdf(-E99, -3.789, 11)
L U df

= .001



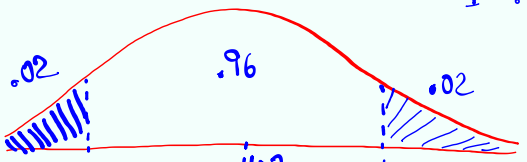
Feb 4-4:33 PM

Find $Z_{\alpha/2}$ for 96% C-level.

Middle Area = .96

$1 - .96 = .04$

$.04/2 = .02$

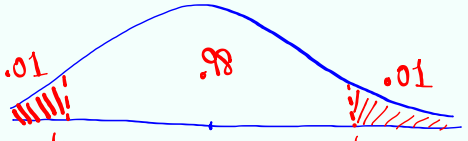


$\rightarrow$ 2.054

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

Find $\pm t_{\alpha/2}$ with $\alpha = .02$ and $df = 8$.

$\alpha/2 = .01$



$= -2.896$

$= \text{invT}(.99, 8) = 2.896$

Feb 4-4:38 PM

In a Sample of 245 adults, 18% of them had more than one job.

$n = 245$

$\hat{p} = .18$

$\Rightarrow x = n\hat{p} = 245(.18) = 44.1 \rightarrow x = 45$

if decimal $\rightarrow$ Round-up

Find confidence interval for the prop. of all adults that have more than one job.

$\rightarrow$ NO C-level use .95

1-PropZInt

$.14 < p < .23$

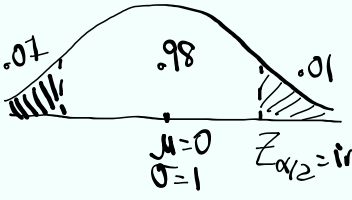
$E = \frac{.23 - .14}{2} = .045$

$\hat{p} = \frac{.23 + .14}{2} = 18.5\%$

Feb 4-4:45 PM

How many adults should we survey if we wish to be 98% Confident and error not to exceed 4%?

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



$z_{\alpha/2} = \text{invNorm}(.99,0,1)$

$= (.18)(.82)\left(\frac{2.326}{.04}\right)^2$

$= 499.097\ldots$

$n = 500$

Suppose $\hat{P}$ & $\hat{q}$ are unknown

$$n = .25\left(\frac{z_{\alpha/2}}{E}\right)^2 = .25\left(\frac{2.326}{.04}\right)^2$$

$n = 846$

Feb 4-4:52 PM

A Sample of 40 nurses had a mean age of 42.5 yrs.

$n = 40$

$\bar{x} = 42.5$ ← Round to 1-dec.

It is known that standard deviation of ages all nurses is 8.75 yrs.

$\sigma = 8.75$

Find 90% Conf. interval for the mean age of all nurses.

▷ C-level: .9

$40.2 < \mu < 44.8$

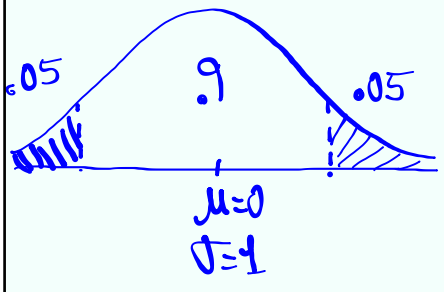
Since σ is known we use ZInterval

$E = \frac{44.8 - 40.2}{2} = 2.3$

$\bar{x} = \frac{44.8 + 40.2}{2} = 42.5$

Feb 4-4:58 PM

Find min. sample size needed if we wish to be 90% confident and error to be within 5 yrs.



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

$$= \left(\frac{1.645 \cdot 8.75}{5}\right)^2$$

$z_{.05} = \text{invNorm}(.95, 0, 1) =$ $= 8.287$ $\boxed{n = 9}$

Feb 4-5:04 PM

12 exams were randomly selected. Here are the scores:

92	88	100	75
90	68	80	78
100	55	85	70

Find

1) $\bar{x} \approx 82$ Round to whole #

2) $s \approx 13$

3) Find Conf. interval for the mean score of all exams.

$\boxed{74 < \mu < 90}$

NO C-level $\Rightarrow$ 95%

σ unknown $\Rightarrow$ T Interval

$E = \frac{90 - 74}{2} = 8$

$\bar{x} = \frac{90 + 74}{2} = 82$

Feb 4-5:09 PM

How many exams should we randomly select if we wish to be 99% confident and error to be within 4 pts?

Since σ unknown $\rightarrow$ $n = \left(\frac{z_{\alpha/2} \cdot s}{E}\right)^2$

$z_{\alpha/2} = \text{invNorm}(.995, 0, 1)$

$= \left(\frac{2.576 \cdot 13}{4}\right)^2$

$= 70.090\ldots$

$n = 71$

SG 21 & 22

Feb 4-5:15 PM