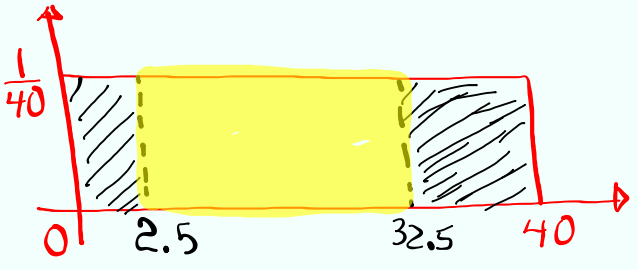
Statistics

Lecture 38

Feb 19-8:47 AM

Consider a uniform Prob. dist. for $0 \le x \le 40$.

Find $P(x < 2.5 \text{ OR } x > 32.5)$



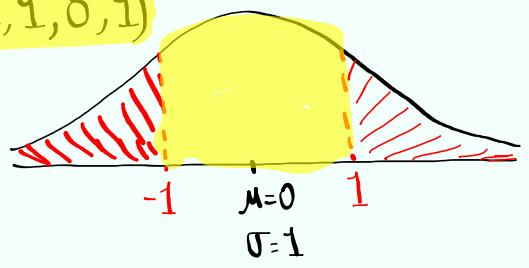
$$= 1 - (32.5 - 2.5) \cdot \frac{1}{40} = 1 - \frac{30}{40} = \boxed{\frac{1}{4}}$$

Nov 6-8:49 AM

Find $P(Z<-1 \text{ OR } Z>1)$

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

$= .317$

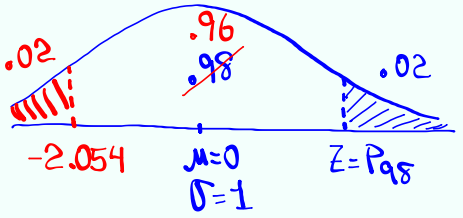


Find $Z = P_{98}$

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

≈ 2.054

Using Symmetry $Z = P_2 = -2.054$



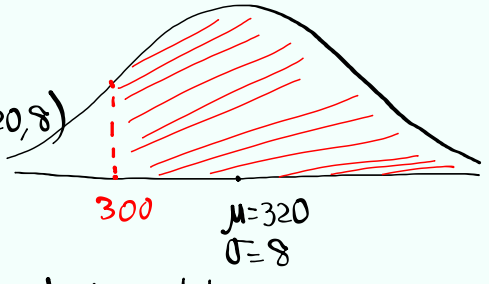
Nov 6-8:53 AM

Given $N(320, 8)$

Find $P(x>300)$

$\text{normalcdf}(300, E99, 320, 8)$

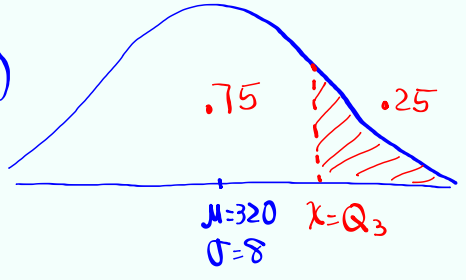
$= .994$



Find $x = Q_3$, Round to whole #.

$x = \text{invNorm}(.75,320,8)$

≈ 325

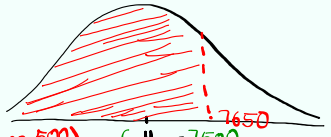


Nov 6-8:59 AM

Salaries of teachers are normally dist with $\mu = \$7500$ and $\sigma = \$500$. $N(7500, 500)$

If we randomly Select $n = 5$ 5 teachers find the Prop. that their mean Salary is below \$7650.

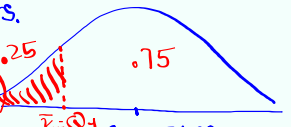
$P(\bar{x} < 7650)$



$= \text{normalcdf}(-E99, 7650, 7500, \frac{500}{\sqrt{5}})$ CLT $\{\mu_{\bar{x}} = 7500, \sigma_{\bar{x}} = \frac{500}{\sqrt{5}}$

$\approx$ .749

Find $\bar{x} = Q_1$ for randomly selected groups of 5 teachers.



$\bar{x} = \text{invNorm}(.25, 7500, \frac{500}{\sqrt{5}})$ CLT $\{\mu_{\bar{x}} = 7500, \sigma_{\bar{x}} = \frac{500}{\sqrt{5}}$

$\approx$ 7349

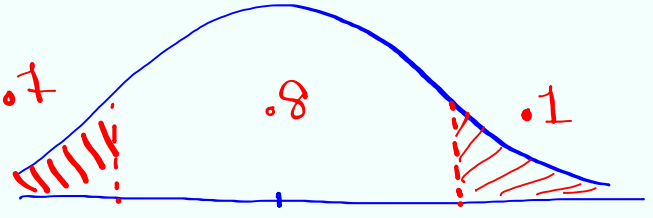
Nov 6-9:03 AM

Find $z_{.1}$ → Right Area

$\frac{\alpha}{2} = .1$

$\alpha = .2$

$1 - \alpha = .8$ Conf. level (Middle Area)



-1.282 $-z_{.1}$ $\mu = 0$ $\sigma = 1$ $z_{.1}$ 1.282

$z_{.1} = \text{invNorm}(.9, 0, 1)$

$z_{\alpha/2}$ is called Critical Value = 1.282

Nov 6-9:13 AM

Find $\pm z_{\alpha/2}$ for 95% Conf. level.

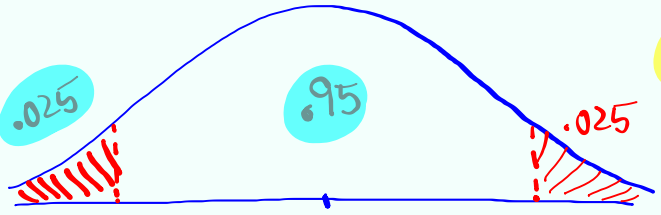
Middle Area

.95

$1-\alpha = .95$

$\alpha = .05$

$\frac{\alpha}{2} = .025$ ← Area of each tail



Critical Values

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

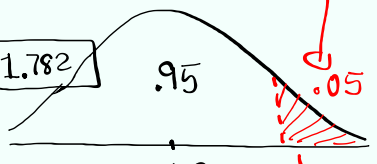
$= 1.960$

Nov 6-9:17 AM

Find $t_{.05}$ with $df = 12$.

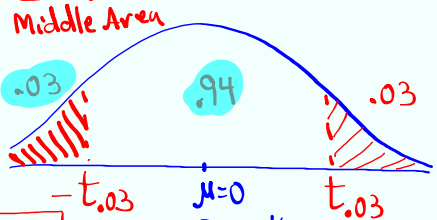
$\text{invT}(.95, 12) = 1.782$

left Area, df



Find $\pm t_{\alpha/2}$ for 94% C-level with $df = 19$.

Middle Area



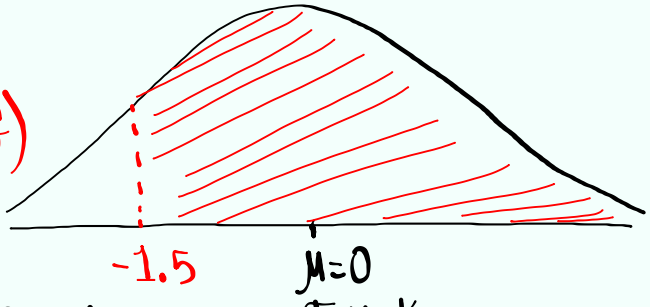
$t_{.03} = \text{invT}(.97, 19) = 2.000$

Nov 6-9:21 AM

Find $P(t > -1.5)$ with $df = 15$.

2nd | VARS

tcdf(L, U, df)



tcdf(-1.5, E99, 15) = .923

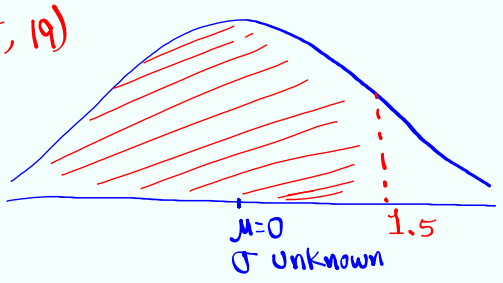
σ unk
df = 15

Nov 6-9:28 AM

Find $P(t < 1.5)$ with $df = 19$.

= tcdf(-E99, 1.5, 19)

= .925



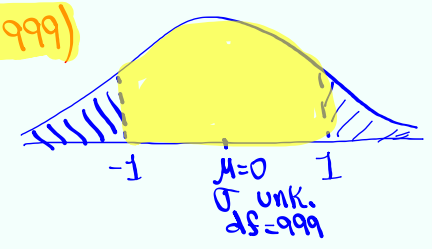
σ unknown

df = 19

Find $P(t < -1 \text{ or } t > 1)$ with $df = 999$.

= 1 − tcdf(−1, 1, 999)

= .318



σ unk.
df = 999

Nov 6-9:32 AM