1. $n = 25 \quad \bar{X} = 7.2 \quad \sigma = 0.5$

$$\bar{X} - Z_{0.25}\frac{\sigma}{\sqrt{n}} < \mu < \bar{X} + Z_{0.25}\frac{\sigma}{\sqrt{n}}$$

25

$$7.2 - 1.96\frac{0.5}{\sqrt{25}} < \mu < 7.2 + 1.96\frac{0.5}{\sqrt{25}}$$

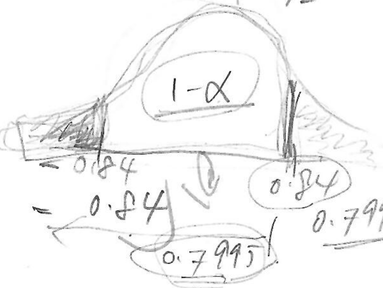
$Z = 1.96$

$$7.004 < \mu < 7.396$$

2. $\left(7.2 \pm \underbrace{0.84\frac{0.5}{\sqrt{25}}}_{0.084} \quad [\,7.116 \quad 7.284\,] \right)$

$1 - \alpha/2$

25



$7.116 = 7.2 - \underline{Z_\alpha}\frac{0.5}{\sqrt{25}}$

$Z = 0.84$

$Z_\alpha = (7.2 - 7.116)\cdot\frac{1}{0.1} = 0.84$

$F(Z = 0.84) = 0.7995.$

15

~~79.95 % CL~~

$0.7995 - (1 - 0.7995)$

$= 2(0.7995) - 1$

$= 0.599$

59.9%

10

~~3.~~

cancel

$$\frac{(n-1)S^2}{\chi^2_{n-1,\alpha/2}} < \sigma^2 < \frac{(n-1)S^2}{\chi^2_{n-1,1-\alpha/2}}$$

$$\frac{24.1}{\chi^2_{24,0.05}} < \sigma^2 < \frac{24.1}{\chi^2_{24,0.95}}$$

$\chi^2_{24,0.05} = 36.42 \qquad \chi^2_{24,0.95} = 13.85$

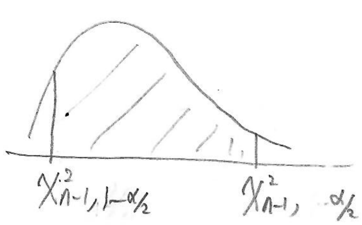
$1-\alpha = 0.90$

$\alpha = 0.1$

$\alpha/2 = 0.05$

χ^2, 24, 0.05

24, 0.95



$$\boxed{0.659 < \sigma^2 < 1.733.}$$

$\chi^2_{1-\alpha/2} < \frac{(n-1)S^2}{\sigma^2} < \chi^2_{\alpha/2} \Rightarrow \_ < \sigma^2 < \_$

4. $H_0: \mu = 7$

$H_1: \mu > 7$

5

25

Upper tail

Reject H_0 if $\bar{X} > \mu + Z_{0.05}\frac{\sigma}{\sqrt{n}}$

$7 + 1.65 * 0.1$

$= 7.165$

10

$Z = 1.65$

$\frac{\bar{X} - \mu}{\sigma/\sqrt{n}} > Z_{0.05} = 1.65$

$\frac{7.2 - 7}{0.5/5} = 2$

since $\bar{X} = 7.2 > 7.165.$

Reject H_0.

10

25

conclude that popul. mean sleep time is greater than 7