Homework 9

1.

a. $\bar{x} \pm 2.81\sigma/\sqrt{n}$

$z_{\frac{\alpha}{2}} = 2.81$

$\frac{\alpha}{2} = 0.0025$

$\alpha = 0,005$

conf. level $= 1-\alpha = 0,995$

b. $\bar{x} \pm 1,44\sigma/\sqrt{n}$

$z_{\frac{\alpha}{2}} = 1.44$

$\frac{\alpha}{2} = 0,0749$

$\alpha = 0,1498$

conf. level $= 1-\alpha = 0,8502$

c. conf. level $= 1-\alpha = 0,997$

$\alpha = 0,003$

$z_{\frac{\alpha}{2}} = z_{0,0015} = \pm 2,96$

d. conf. level = 0,75

$1 - \alpha = 0,75$

$\alpha = 0,25$

$\pm z_{\frac{\alpha}{2}} = z_{0,125} = \pm 1,155$

2. $\sigma = 0,75$

a. $n = 20$

$\bar{x} = 4,85$

95% CI

$CI = \bar{x} \pm z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}$

$\frac{\alpha}{2} = \frac{0,05}{2}$

$z_{0,025} = \pm 1,96$

b. CL = 0,88

$n = 16$

$\bar{x} = 4,56$

$CI = 4,85 \pm 1,96\left(\frac{0,75}{\sqrt{20}}\right)$

$= 4,85 \pm 0,329 =$

$= [4,521, 5,179]$

b. $\bar{x} = 4,56$ 98% CI

$n = 16$

$$\frac{\alpha}{2} = \frac{0,02}{2} = 0,001$$

$$z_{0,001} = \pm 2,33$$

$$CI = \bar{x} \pm z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}} = 4,56 \pm 2,33 \cdot \frac{0,75}{\sqrt{16}} =$$

$$= 4,56 \pm 0,436 = [4,124 ; 4,996]$$

c. 95% CI

$$\frac{\alpha}{2} = 0,025$$

$$z_{\frac{\alpha}{2}} = \pm 1,96$$

$w = 0,4$

$$w = 2 z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}$$

$$\sqrt{n} = \frac{2 \cdot z_{\alpha/2} \sigma}{w}$$

$$n = \left(\frac{2 z_{\frac{\alpha}{2}} \sigma}{\omega}\right)^2 = \left(\frac{2 \cdot 1{,}96 \cdot 0{,}75}{0{,}4}\right)^2 =$$

$$= 54{,}0225$$

$$n \approx 55$$

d. 99% CI $\omega = 0{,}1$

$$\frac{\alpha}{2} = 0{,}005 \qquad z_{\frac{\alpha}{2}} = \pm 2{,}58$$

$$\omega = 2 z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}$$

$$\sqrt{n} = 2 z_{\frac{\alpha}{2}} \frac{\sigma}{\omega}$$

$$n = \left(\frac{2 \cdot 2{,}58 \cdot 0{,}75}{0{,}1}\right)^2 = (38{,}7)^2 =$$

$$= 1497{,}69$$

$$n = 1498$$

3. $n = 44$

$\bar{x} = 35.02$

$\sigma = 18.94$

a. 95% CI

$\frac{\alpha}{2} = 0,025$

$z_{\frac{\alpha}{2}} = \pm 1,96$

$CI = \bar{x} \pm 1,96 \cdot \frac{\sigma}{\sqrt{n}} =$

$= 35.02 \pm 1,96 \cdot \frac{18.94}{\sqrt{44}} =$

$\approx 35,02 \pm 26,25 \approx [8,77; 61,27]$

b. 95% PI

$P(\quad X - 35.02$

$\bar{X} \pm t_{\frac{\alpha}{2}, n-1} \cdot s\sqrt{1 + \frac{1}{n}} =$

$= 35,02 \pm 2,32 \cdot 18.94 \sqrt{1 + \frac{1}{44}} =$

$\approx 35,02 \pm 44,44$

$[-9,42; 79,46]$

4. $n=126$

$\bar{x}=29.2$

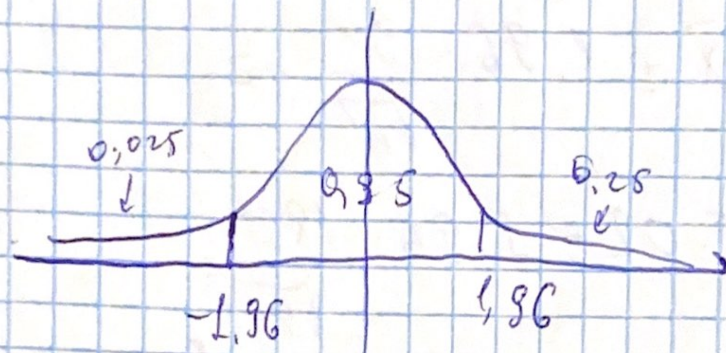
$\sigma=7.5$

95% CI-ն գտնել

$\alpha = 0,05$

$\frac{\alpha}{2} = 0,025$

$Z_{0,025} = \pm 1,96$



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$CI = 29.2 \pm 1.96 \cdot \frac{7.5}{\sqrt{126}}$

$[27,89 \ ; \ 30.51]$

18,2-ը չի պատկանում այս [illegible]-ին
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