$x_{1-\alpha} = x_{0,995} \approx 2,58$

Доверит. интервал: $7 - \frac{1}{\sqrt{6}} \cdot 2,58 \le \mu \le 7 + \frac{1}{\sqrt{6}} \cdot 2,58$

$5,95 \qquad\qquad 8,05$

Ответ: $\mu \in (5,95 ; 8,05)$

N4

$x_i \sim N(\mu, \sigma^2)$

ОМП $\hat{\mu}, \hat{\sigma} - ?$

$$P(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

$$L = \prod_{i=1}^{n} \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}} =$$

$$= \frac{1}{(2\pi\sigma^2)^{n/2}} \cdot e^{-\frac{\sum_{i=1}^{n}(x_i-\mu)^2}{2\sigma^2}}$$

$$\ln L = -\frac{n}{2}\ln 2\pi - \frac{n}{2}\ln \sigma^2 - \frac{1}{2\sigma^2}\sum_{i=1}^{n}(x_i-\mu)^2$$

$$\frac{\partial \ln L}{\partial \mu} = \frac{1}{2\sigma^2}\sum_{i=1}^{n} 2(x_i-\mu) = \frac{n\bar{x} - n\mu}{\sigma^2} = 0 \Rightarrow n\bar{x} - n\mu = 0$$

$$\hat{\mu} = \bar{x}$$

$$\frac{\partial \ln L}{\partial \sigma^2} = -\frac{n}{2\sigma^2} + \frac{\sum_{i=1}^{n}(x_i-\mu)^2}{2\sigma^4} = 0$$

$$\sigma^2 = \frac{1}{n}\sum_{i=1}^{n}(x_i-\mu)^2$$

$$\hat{\mu} = \bar{x}$$