

№ 8.1 – 8.5, 8.7, 8.8

Довірче значення $\sqrt{9}$
18.1

$$\mu_x = 4 \quad \sigma_x = 0,4$$

$$a) P\{\xi \in (3,5)\} =$$

$$= \Phi\left(\frac{5-4}{0,4}\right) - \Phi\left(\frac{3-4}{0,4}\right) =$$

$$= \Phi(2,5) + \Phi(-2,5) =$$

$$= 0,4938 + 0,4938 = \underline{0,9876}$$

$$b) P\{\xi \in (-?,?)\} = 0,8$$

~~$P\{\xi \in (-a < \frac{X-\mu_x}{\sigma_x} < d)\} =$~~

$$= 2\Phi(d) - 1 = 0,8 \quad \boxed{\begin{matrix} \text{Омбем} \\ (3,4874; 4,5126) \end{matrix}}$$

$$\Phi(a) = 0,9 \Rightarrow a \approx 1,2816$$

~~$\frac{x-\mu_x}{\sigma_x} = \frac{x-4}{0,4} = 1,2816 =$~~

$$(4 - 1,2816, 4 + 1,2816) \approx (3,4874, 4,5126)$$

$$\sqrt{8.2}$$

$$m_x = 50 \quad \sigma_x = 20 \quad \gamma = 0,954$$

$$P\{\lvert \xi - 50 \rvert \leq 3 \cdot 20\} =$$

$$P\{\lvert \xi - 50 \rvert \leq 60\} = 0,954$$

$$0,954 = 2 \varphi_0\left(\frac{\varepsilon}{20}\right)$$

$$0,477 = \varphi_0\left(\frac{\varepsilon}{20}\right)$$

$$\frac{\varepsilon}{20} = 2,00$$

(0,4772
erreichte
werte
0,4778)

$$\varepsilon = 20 \cdot 2 = 40$$

$$\sqrt{8.3}$$

$$m_x = 7 \text{ cm} \quad \sigma_x = 0,04 \text{ cm}^2 \quad \sigma = \sqrt{\sigma_x} =$$

$$P\{\xi \in [6,7; 7,3]\} = 0,2$$

$$P = \frac{7-6,7}{7,3-6,7} = \frac{0,3}{0,6} = 0,5$$

$$\frac{6,7 - 7}{0,2} = -1,5$$

$$\frac{7,3 - 7}{0,2} = 1,5$$

$$P(\xi \in [-1,5; 1,5]) =$$

$$= \varPhi(1,5) - \varPhi(-1,5) =$$

$$= \underline{\underline{-}} \frac{0,4332}{\sqrt{18,4}} + \underline{\underline{0,4332}} = \underline{\underline{0,8664}}$$

$$\mu_x - ? \quad \sigma_x - ?$$

$$\mathcal{N}_{\text{UV}}(5, 9)$$

$$\mu_x = \mathcal{N}_{\text{UV}}(x)$$

$$\sigma_x^2 = M(\varepsilon - \mu_x)^2 = M(\varepsilon^2) - (\mu_x)^2$$

$$\sigma_x = \sqrt{\sigma_x^2}$$

$$f(x) = \begin{cases} \frac{1}{9-5}x & \text{für } x \in [5, 9] \\ 0 & \text{sonst } x \notin [5, 9] \end{cases}$$

$$\bar{x} = \frac{5+9}{2} = 7$$

$$D_x = \int_5^9 (x - 7)^2 \cdot \frac{1}{9-5} dx$$

$$D_x = 0,25 \int_5^9 x^2 - 14x + 49 dx =$$

$$= \cancel{0,25} \left[\frac{x^3}{3} - \frac{14x^2}{2} \right]_5^9 =$$

$$= \cancel{\frac{x^3}{3}} - 7x^2 \Big|_5^9 = \cancel{\frac{x^3}{3} - 21x^2} \Big|_5^9 =$$

$$= \cancel{\frac{9^3 - 21 \cdot 9^2}{3}} - \cancel{\frac{5^3 - 21 \cdot 5^2}{3}} =$$

$$= \cancel{\frac{729 - 1701}{3}} - \cancel{\frac{125 - 525}{3}} =$$

$$= -324 - (-\cancel{133}) =$$

$$u = x - 7 \quad du = dy$$

$$x = 5 \Rightarrow u = 5 - 7 = -2$$

$$x = 9 \Rightarrow u = 9 - 7 = 2$$

$$\sigma_x = 0,25 \int_{-2}^2 u^2 du$$

$$\sigma_x = 0,25 \cdot \left(\frac{u^3}{3} \Big|_{-2}^2 \right) =$$

$$= 0,25 \left(\frac{2^3}{3} - \frac{(-2)^3}{3} \right) =$$

$$= 0,25 \left(\frac{8}{3} + \frac{8}{3} \right) = \cancel{0,25} \frac{1}{3} \cdot \frac{16}{3} =$$

$$= \frac{16}{9} = \frac{4}{3}$$

$$\sigma_x = \sqrt{\frac{4}{3}} = 2 \sqrt{\frac{1}{3}} \approx 1,15$$

$$\lambda = 2 \quad P = 1 - P\{X \leq 2\}$$

$$P = 1 - (P\{X=0\} \cdot P\{X=0\}) -$$

$$-(P\{X=0\} \cdot P\{X=1\}) -$$

$$-(P\{X=1\} \cdot P\{X=1\}) -$$

$$-(P\{X=2\} \cdot P\{X=0\}) -$$

$$-(P\{X=0\} \cdot P\{X=2\})$$

$$P = 1 - \left(\frac{2^0}{0!} e^{-2} \cdot \frac{2^0}{0!} e^{-2} \right) -$$

$$-\left(\frac{2^1}{1!} e^{-2} \cdot \frac{2^0}{1!} e^{-2} \right) -$$

$$-\left(\frac{2^0}{1!} e^{-2} \cdot \frac{2^1}{0!} e^{-2} \right) -$$

$$-\left(\frac{2^1}{1!} e^{-2} \cdot \frac{2^1}{1!} e^{-2} \right) - \left(\frac{2^2}{2!} e^{-2} \cdot \frac{2^0}{0!} e^{-2} \right) -$$

$$-\left(\frac{2^0}{0!} e^{-2} \cdot \frac{2^2}{2!} e^{-2} \right) =$$

$$\begin{aligned}
 &= 1 - e^{-4} - 2e^{-4} - 2e^{-4} - 4e^{-4} - \\
 &\quad - 2e^{-4} - 2e^{-4} = \\
 &= 1 - 13e^{-4} = 1 - 13 \cdot 0,018 = \\
 &= 1 - 0,234 = \underline{\underline{0,766}}
 \end{aligned}$$

$$\sqrt{8,8}$$

$$\lambda_{\text{rec}} = 60$$

$$\lambda = 60 \cdot \frac{0,5}{60} = 0,5$$

$$a) P(0) = \frac{0,5^0 e^{-0,5}}{0!} = e^{-0,5} \approx 0,6065$$

$$\mathfrak{F} P(1) = \frac{0,5^1 e^{-0,5}}{1!} = 0,5 \cdot e^{-0,5} \approx$$

$$\approx 0,3033$$

$$b) P(2) = \frac{0,5^2 e^{-0,5}}{2!} = 0,25 \cdot \frac{e^{-0,5}}{2} \approx$$

$$\approx 0,0758$$

Дз № 8.11, 8.17, 8.15

$$c) P(K \geq 1) = 1 - P(0) = 1 - 0,6065 \approx 0,3935$$

$$g) P(K \leq 2) = P(0) + P(1) + P(2) \approx \\ \approx 0,6065 + 0,3033 + 0,0758 = 0,9856$$

18.11

$$\mu_x = 46 \quad \mu_x = 25 \quad \sigma = \sqrt{\Delta x} = 5$$

$$P(40 \leq X \leq 60) =$$

$$= \varPhi\left(\frac{60 - 46}{5}\right) - \varPhi\left(\frac{40 - 46}{5}\right) =$$

$$= \varPhi(2,8) - \varPhi(-1,2) =$$

$$= 0,9974 + 0,3849 = 0,8823$$

18.15

[2; 8]

$$\mu_x = \frac{2+8}{2} = 5$$

$$D_x = \int_2^8 (x-5) \cdot \frac{1}{8-2} dx$$

$$u = x - 5 \quad du = dx$$

$$x = 2 \Rightarrow u = 2 - 5 = -3$$

$$x = 8 \Rightarrow u = 8 - 5 = 3$$

$$D_x = \frac{1}{6} \int_{-3}^3 u^2 du$$

$$D_x = \frac{1}{6} \left(\frac{u^3}{3} \Big|_{-3}^3 \right) =$$

$$= \frac{1}{6} \left(\frac{27}{3} - \frac{(-27)}{3} \right) = \frac{1}{6} \cdot \frac{54}{3} =$$

$$= \frac{54}{18} = 3$$

$$G_x = \sqrt{3} = \underline{\underline{1,7321}}$$

$$\text{M}_x = \sqrt{8 \cdot 17}$$

$$\text{M}_x = 2000$$

$$x = 3000$$

$$\lambda = \frac{1}{n_x} = \frac{1}{2000}$$

$$P(x) = \cancel{\lambda} e^{-\lambda x} = \frac{e^{-\frac{3000}{2000}}}{\cancel{8000}} = e^{-1,5} = 0,223$$

$$= \cancel{e^{-1,5}} \cancel{2000} \approx 2231 \cancel{2000} \approx 0,2231171$$

