

s24512_zad1

$$P(S_{100} \geq 250) = 1 - P(S_{100} \leq 250)$$

$$k=100$$

$$O=2$$

$$E[S_{100}] = 100 * 2 = 200$$

$$\text{Var}(S_{100}) = 100 * 2^2 = 400$$

$$S_{100} = N(200, 400)$$

$$P(S_{100} \geq 250) = P(Z \geq (250-200)/20) = P(Z \geq 2,5)$$

$$Z \text{ tabeli rozkladu normalnego: } P(Z \leq 2,5) \approx 0,9938$$

$$P(Z \geq 2,5) = 1 - P(Z \leq 2,5) \approx 0,0062$$

s24512_zad2

$$E[X_i] = 5$$

$$p = 1/5 = 0.2$$

$$\text{Var}(X) = (1-0.2)/0.2^2 = 20$$

$$E[S_{125}] = 125 * E[X] = 625$$

$$\text{Var}(S_{125}) = 125 * \text{Var}(X) = 125 * 20 = 2500$$

$$O = \sqrt{2500} = 50$$

$$Z = \frac{S_{125} - E[S_{125}]}{\sqrt{\text{Var}(S_{125})}} = \frac{S_{125} - 625}{50}$$

$$P(S_{125} > 600) = P(Z > -0.5) = 1 - P(Z < -0.5) \approx 1 - 0.3085 \approx 0.6915$$

$$P(S_{125} > 600) \approx 0.6915$$

zad3_s24512

$$E[X] = \text{całka}(1,0) z x^{\frac{4}{3}} \cdot (\text{pierwiastek trzeciego stopnia z } x) dx$$

$$E[X] = \frac{4}{3} \cdot \frac{3}{7} = \frac{4}{7}$$

$$E[X^2] = \text{całka}(1,0) z x^2 \cdot \frac{4}{3} \cdot x^{1.3} dx = \frac{3}{10}$$

$$E[X^2] = \frac{4}{3} \cdot \frac{3}{10} = 0.4$$

$$E[X]^2 = \frac{16}{49}$$

$$\text{Var}[X] = \frac{2}{5} - \frac{16}{49} = \frac{18}{245}$$

$$S_{490} = N(490 \cdot E[X], 490 \cdot \text{Var}(X))$$

$$S_{490} = N(280, 6)$$

$$Z = \frac{S_{490} - 280}{6} = \frac{265 - 280}{6} = -2.5$$

$$P(Z < -2.5) \approx 0.0062$$

$$P(S_{490} < 265) \approx 0.0062$$

zad4_s24512

$$E[X] = -1 \cdot 0.1 + 0 \cdot 0.5 + 1 \cdot 0.3 + 2 \cdot 0.1$$

$$E[X] = 0.4$$

$$E[X]^2 = 1 \cdot 0.1 + 0 \cdot 0.5 + 1 \cdot 0.3 + 4 \cdot 0.1$$

$$E[X^2] = 0.8$$

$$E[X]^2 = 0.16$$

$$\text{Var}(X) = 0.8 - 0.16 = 0.64$$

$$S_{100} = N(100 \cdot E[X], 100 \cdot \text{Var}(X))$$

$$S_{100} = N(40, 64)$$

$$E[S_{100}] = 40$$

$$\text{Var}(S_{100}) = 8$$

$$Z = \frac{S_{100} - E[S_{100}]}{\sqrt{\text{Var}(S_{100})}} = \frac{45 - 40}{\sqrt{8}} = 0.625$$

$$P(S_{100} \leq 45) = P(Z \leq 0.625) \approx 0.734$$

$$P(S_{100} \leq 45) \approx 0.734$$