8. és 9. Gyakorlat

Abszolút folytonos valószínűségi változók - Eredmények

1.

$$f_X(t) = \begin{cases} 2-2t, & \text{ha } t \in (0;1), \\ 0, & \text{különben,} \end{cases} \qquad \mathbb{E}(X) = \frac{1}{3}, \qquad \mathbb{D}(X) = \frac{1}{3\sqrt{2}} \approx 0{,}2357$$

2.

$$f_X(t) = \begin{cases} \frac{2+t}{4}, & \text{ha } t \in (-2;0), \\ \frac{2-t}{4}, & \text{ha } t \in (0;2), \\ 0, & \text{különben,} \end{cases} \quad , \qquad \mathbb{E}(X) = 0, \qquad \mathbb{D}(X) = \sqrt{\frac{2}{3}} \approx 0{,}8165$$

3.

$$f_X(t) = \begin{cases} 4-8t, & \text{ha } t \in (0;\frac{1}{2}), \\ 0, & \text{különben,} \end{cases} \qquad \mathbb{E}(X) = \frac{1}{6}, \qquad \mathbb{D}(X) = \frac{1}{6\sqrt{2}} \approx 0{,}1179$$

---

4. $\alpha = \frac{1}{2}$ $\qquad \mathbb{P}\left(\frac{1}{9} < X < \frac{1}{4}\right) = \frac{1}{6}$

5. 45,072 l, 16,667 l

---

6. a) $a = \frac{1}{3}$, ekkor X egyenletes eloszlású a $[0;3]$ intervallumon

   b) $\mathbb{P}(2 < X < 5) = \frac{1}{3}$

   c) $\mathbb{E}(X) = 1{,}5$

7.

a) $\alpha = \frac{3}{4}$, $F_X(t) = \begin{cases} 0 & t \le 0 \\ \frac{3}{4}t^2 - \frac{1}{4}t^3 & 0 < t \le 2, \\ 1 & 2 < t \end{cases}$ $\mathbb{E}(X) = 1$, $\mathbb{D}(X) = \frac{1}{\sqrt{5}} \approx 0{,}4472$

b) $\alpha = \frac{3}{2}$, $F_X(t) = \begin{cases} 0 & t \le 2 \\ \sqrt{(t-2)^3} & 2 < t \le 3, \\ 1 & 3 < t \end{cases}$ $\mathbb{E}(X) = 2{,}6$, $\mathbb{D}(X) \approx 0{,}2619$

c) $\alpha = 2$, $F_X(t) = \begin{cases} 0 & t \le 1 \\ (t-1)^2 & 1 < t \le 2, \\ 1 & 2 < t \end{cases}$ $\mathbb{E}(X) = \frac{5}{3}$, $\mathbb{D}(X) = \frac{1}{3\sqrt{2}} \approx 0{,}2357$

8.

$$f_Y(t) = \begin{cases} \frac{1}{2\sqrt{t}}, & \text{ha } t \in (1;4), \\ 0, & \text{különben,} \end{cases} \qquad \alpha = 8$$