

Chapter 05 연습문제 정답

1.

(a) $a = \frac{2}{9}, b = \frac{1}{9}$

(b) $\frac{29}{36}$

(c) $\frac{3}{4}$

(d) $\frac{28}{9}$

(e) $\frac{476}{81}$

2. $k = \frac{1}{\sqrt[3]{3}}$

3.

(a) $f(x) = \begin{cases} \frac{1}{15}, & x = 0 \\ \frac{8}{15}, & x = 1 \\ \frac{2}{5}, & x = 2 \\ 0, & \text{다른 곳에서} \end{cases}$

(b) $\frac{8}{15}$

(c) $\frac{14}{15}$

(d) $F(x) = \begin{cases} 0, & x < 0 \\ \frac{1}{15}, & 0 \leq x < 1 \\ \frac{3}{5}, & 1 \leq x < 2 \\ 1, & x \geq 2 \end{cases}$

4.

(a)

$$f(x) = \begin{cases} 0.6, & x = 2 \\ 0.3, & x = 4 \\ 0.1, & x = 8 \\ 0, & \text{다른 곳에서} \end{cases}$$

(b) $P(X < 5) = 0.9, P(X \geq 5) = 0.1$

(c) 3.2

(d) 3.06

5.

$$(a) f(x) = \begin{cases} \frac{1}{14} & , x = 0 \\ \frac{8}{21} & , x = 1 \\ \frac{3}{7} & , x = 2 \\ \frac{4}{35} & , x = 3 \\ \frac{1}{210} & , x = 4 \\ 0 & , \text{다른 곳에서} \end{cases}$$

$$(b) \frac{5}{42}$$

$$(c) \frac{13}{14}$$

$$(d) F(x) = \begin{cases} 0 & , x < 0 \\ \frac{1}{14} & , 0 \leq x < 1 \\ \frac{19}{42} & , 1 \leq x < 2 \\ \frac{37}{42} & , 2 \leq x < 3 \\ \frac{209}{210} & , 3 \leq x < 4 \\ 1 & , x \geq 4 \end{cases}$$

6.

$$(a) f(x) = \begin{cases} \frac{125}{512} & , x = 0 \\ \frac{225}{512} & , x = 1 \\ \frac{135}{512} & , x = 2 \\ \frac{27}{512} & , x = 3 \\ 0 & , \text{다른 곳에서} \end{cases}$$

$$(b) \frac{81}{256}$$

$$(c) \frac{387}{512}$$

$$(d) F(x) = \begin{cases} 0 & , x < 0 \\ \frac{125}{512} & , 0 \leq x < 1 \\ \frac{175}{256} & , 1 \leq x < 2 \\ \frac{485}{512} & , 2 \leq x < 3 \\ 1 & , x \geq 3 \end{cases}$$

7.

(a) $F(x) = 1 - \frac{1}{x^3}, x \geq 1$

(b) $\frac{3}{2}$

(c) $\frac{3}{4}$

(d) $\frac{1}{3375}$

(d) $\frac{15624}{15625}$

8.

(a) $f(x) = \frac{1}{10}$

(b) $F(x) = \begin{cases} 0 & , x < 95 \\ \frac{1}{10}1(x-95) & , 95 \leq x < 105 \\ 1 & , x \geq 105 \end{cases}$

(c) $\frac{3}{5}$

(d) $\frac{3}{5}$

9.

(a) $f(x) = \begin{cases} \frac{1}{5}, & x = -1, 1 \\ \frac{3}{5}, & x = 3 \\ 0, & \text{다른 곳에서} \end{cases}$

(b) $f(x) = \begin{cases} \frac{1}{3}, & x = 0, 1, 2 \\ 0, & \text{다른 곳에서} \end{cases}$

10.

(a) $f(x) = 2e^{2(1-x)}, x > 1$

(b) $f(x) = x - \frac{1}{4}x^3, 0 < x < 2$

11.

(증명 생략)

12.

(a) $k = \frac{1}{\pi}$

(b) $F(x) = \frac{1}{2} + \frac{1}{\pi} \tan^{-1} x$

(c) $\frac{1}{2}$

(d) (증명 생략)

13.

(a) $k = 1$

(b) $F(x) = \begin{cases} \frac{1}{2} e^{2x} & , x < 0 \\ 1 - \frac{1}{2} e^{-2x} & , x \geq 0 \end{cases}$

(c) $1 - e^{-2} \approx 0.8647$

(d) 0

14.

(a) $F(x) = 1 - e^{-\lambda x}, x > 0$

(b) $S(x) = e^{-\lambda x}, x > 0$

(c) $h(x) = \lambda$

15.

(a) $1 - e^{-2} \approx 0.865$

(b) $e^{-3} \approx 0.05$

(c) $\frac{1}{100}$

16.

생존함수 : $S(x) = e^{-2x^{1/2}}, x > 0$

분포함수 : $F(x) = 1 - e^{-2x^{1/2}}, x > 0$

확률밀도함수 : $f(x) = x^{-1/2} e^{-2x^{1/2}}, x > 0$

17.

생존함수 : $S(x) = \frac{4}{x^2}, x > 2$

확률밀도함수 : $f(x) = \frac{8}{x^3}, x > 2$

위험률함수 : $h(x) = \frac{2}{x}, x > 2$

18.

분포함수 : $F(x) = 1 - e^{-9x^{2/4}}, x > 0$

생존함수 : $S(x) = e^{-9x^{2/4}}, x > 0$

위험률 : $h(x) = \frac{9}{2}x, x > 0$

19.

(a) $e^{-7/5} \approx 0.247$

(b) 약 0.116

(c) 110

(d) 10000

20.

(a) 0.66

(b) 0.9044

(c) -0.02

(d) 8.1396

21.

(a) $\frac{3}{8}$

(b) $\frac{19}{320}$

(c) $\frac{5}{2}$

(d) $\frac{19}{80}$

22.

(a) 2.1

(b) 1.29

(c) $-\frac{0.288}{1.136^3} \approx -0.196$

(d) $\frac{3.738}{1.29^2} \approx 1.741$

23.

(a) $\frac{1}{2}$

(b) $\frac{1}{20}$

(c) 0

(d) $\frac{15}{7}$

24.

(a) 2.44

(b) 분산 : 0.9664, 표준편차 : 약 0.983

(c) 0.7

(d) 0.97

25.

(a) 50

(b) 2500

(c) $1 - e^{-2} \approx 0.865$

(d) $1 - e^{-3} \approx 0.95$

26.

(a) $\frac{5}{9}$

(b) $\frac{8}{9}$