第二章第四节

1、(1) $f(1)=2e^{-2}$

1、(5) $\lim\limits_{x\to+\infty}F(x)=\lim\limits_{x\to+\infty}A(1-e^{x})=1$

$\therefore A=1$

$P(1<x\leq 3)=F(3)-F(1)=-\frac{1}{e^{3}}+\frac{1}{e}$

$$f(x)=\begin{cases}e^{x} & x\geq 0\\ 0 & \text{其他}\end{cases}$$

1、(6) 0

2、(1) C (2) C (3) A (4) C (5) B

4、 $F(x)=\int_{-\infty}^{x}f(x)\,dx$

$$=\begin{cases}1 & x>0\\ 2x-\frac{x^{2}}{2}-1 & 1<x\leq 2\\ \frac{1}{2}x^{2} & 0<x\leq 1\\ 0 & \text{其他}\end{cases}$$

附加题

(1) $\int_{-\infty}^{+\infty}f(x)\,dx=1$

(2) $$F(x)=\begin{cases}1 & x\geq 3\\ \frac{3}{20}x^{2}+\frac{2}{20} & 2\leq x<3\end{cases}$$

$$\int_1^2 Ax^2 dx + \int_2^3 Ax\,dx = 1$$

$$\frac{A}{3}x^3\Big|_1^2 + \frac{A}{2}x^2\Big|_2^3 = 1$$

$$\frac{8A}{3} - \frac{A}{3} + \frac{9A}{2} - 2A = 1$$

$$A = \frac{6}{29}$$

$$\begin{cases} \frac{2}{29}x^3 - \frac{2}{29} & 1 \le x < 2 \\ 0 & \text{其他} \end{cases}$$

(3)

$$P(|x| \le 2) = P(-2 \le x \le 2) = F(2) - F(-2) = \frac{14}{29}$$

第二章第五节

3、(1)

$$P(X > 10) = 1 - P(X \le 10)$$

$$F(x) = \begin{cases} 1 - e^{-\frac{x}{5}}, & x > 0 \\ 0, & x \le 0 \end{cases}$$

$$\therefore P(X > 10) = 1 - P(X \le 10) = 1 - F(10) = e^{-2}$$

(2)

$$P(Y \le 1) = P(Y=0) + P(Y=1) = C_5^0 \cdot (1-e^{-2})^5 + C_5^1 \cdot (1-e^{-2})^4 \cdot e^{-2}$$

4、

$$P(A \cup B) = P(A) + P(B) - P(A) \cdot P(B)$$

$$P(A) = F_A(a) = \frac{a-1}{3-1} = \frac{a-1}{2}$$

$$P(B) = F_B(a) = \frac{a-1}{3-1} = \frac{a-1}{2}$$

$\therefore$ 设 $P(A) = P(B) = p$

$\therefore \quad 2p - p^2 = \frac{1}{q}$

$p^2 - 2p + 1 = \frac{2}{q}$

$p = 1 \pm \frac{\sqrt{2}}{3}$

$\therefore p = 1 - \frac{\sqrt{2}}{3}$

$\therefore \frac{a-1}{2} = 1 - \frac{\sqrt{2}}{3}$

$a = 3 - \frac{2\sqrt{2}}{3}$