

第三次作业

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姓名: Hollow Man 班级: 班级6 成绩: 分

Hollow Man

一.简答题 (共4题,100.0分)

1 4.pdf

正确答案:

4a.pdf

我的答案:

$$\begin{aligned}
 (1) f(x, y) &= \begin{cases} 4, & y \leq 2x+1, x \leq 0, y \geq 0 \\ 0, & \text{其它} \end{cases} \\
 (2) P(-\frac{1}{4} < x < 0, 0 < y < \frac{1}{4}) &= \int_{-\frac{1}{4}}^0 \int_0^{\frac{1}{4}} 4 dy dx = \frac{1}{4} \\
 (3) \text{关于 } x: F_x(x) &= \begin{cases} 0 & x < -\frac{1}{2} \\ (2x+1)^2 - \frac{1}{2} & -\frac{1}{2} \leq x < 0 \\ 1 & x \geq 0 \end{cases} \therefore f_x(x) = \begin{cases} 8x+4, & -\frac{1}{2} \leq x < 0 \\ 0, & \text{其它} \end{cases} \\
 \text{关于 } y: F_y(y) &= \begin{cases} 0 & y < 0 \\ -y^2+2y & 0 \leq y < 1 \\ 1 & y \geq 1 \end{cases} \therefore f_y(y) = \begin{cases} -2y+2, & 0 \leq y < 1 \\ 0, & \text{其它} \end{cases} \\
 (4) x \text{ 与 } y \text{ 不独立} & \because \text{若 } x, y \text{ 独立, 则 } F(-\frac{1}{4}, \frac{3}{4}) \text{ 应等于 } F_x(-\frac{1}{4})F_y(\frac{3}{4}) = \frac{1}{4} \times \frac{15}{16} = \frac{15}{64} \\
 \text{而实际上 } F(-\frac{1}{4}, \frac{3}{4}) &= \frac{1}{4}
 \end{aligned}$$

2 2.pdf

正确答案:

2a.pdf

我的答案:

$$\begin{aligned}
 2. (1) \int_0^{+\infty} \int_0^{+\infty} k e^{-(3x+4y)} dx dy &= 1 \\
 \therefore \frac{k}{12} &= 1 \Rightarrow k=12 \\
 (2) P(0 \leq x \leq 1, 0 \leq y \leq 2) &= \int_0^1 \int_0^2 12 e^{-(3x+4y)} dx dy \\
 &= (1-e^{-6})(1-e^{-8}) \\
 (3) f_x(x) &= \int_{-\infty}^{+\infty} 12 e^{-(3x+4y)} dy = 3e^{-3x} \\
 f_y(y) &= \int_0^{+\infty} e^{-(3x+4y)} dx = 4e^{-4y} \\
 \therefore \text{有 } f(x, y) &= f_x(x) \cdot f_y(y) = 12 e^{-(3x+4y)} \\
 \therefore X, Y &\text{独立}
 \end{aligned}$$

3 1.pdf

正确答案:

1a.pdf

我的答案:

$$3. F_Y(y) = \begin{cases} 0 & y < e^2 \\ \frac{1}{2} \ln y - 1 & e^2 \leq y < e^4 \\ 1 & y \geq e^4 \end{cases}$$

$$\therefore f_Y(y) = \begin{cases} \frac{1}{2y} & e^2 \leq y < e^4 \\ 0 & \text{其它} \end{cases}$$

4 3.pdf

正确答案:

3a.pdf

我的答案:

$$4. (1) X+Y \sim \begin{pmatrix} 2 & 3 & 4 & 5 \\ \frac{1}{4} & \frac{3}{8} & \frac{1}{4} & \frac{1}{8} \end{pmatrix}$$

$$(2) X-Y \sim \begin{pmatrix} -2 & -1 & 0 & 1 & 2 \\ \frac{1}{8} & \frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{1}{8} \end{pmatrix}$$

$$(3) 2X \sim \begin{pmatrix} 2 & 4 & 6 \\ \frac{5}{8} & \frac{1}{8} & \frac{1}{4} \end{pmatrix}$$