北京理工大学 BEIJING INSTITUTE OF TECHNOLOGY

作 业 纸

课程名称：概统

班级： 教学班级：08012204 姓名：俞乐楠 学号：1120221323 第 1 页

25.

$F'(x) = f(x)$.

$\because \int n f(x) F(x) = (F(x))^n$.

$\because \lim_{x\to\infty} F(x) = 1$. $\therefore \lim_{n\to\infty} F(x)^n = 1$.

∴ 是概率密度函数

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(1) $F(0) = 0$

$\lim_{x\to\infty} F(x) = 1$.

$\begin{cases} B = -1 \\ A = 1 \end{cases}$

(2) $F(x) = \begin{cases} 0 & x \le 0 \\ 1 - e^{-\frac{x^2}{2}} \end{cases}$ $f(x) = F'(x) = \begin{cases} 0 & x \le 0 \\ x e^{-x^2/2} & x > 0 \end{cases}$

(3). $P(1 < X < 2) = F(2) - F(1) = e^{-\frac{1}{2}} - e^{-2}$

31.

(1) $\int_0^{\infty} c e^{-x} = \frac{1}{2}$. $\therefore C = \frac{1}{2}$.

(2) $P[-1 < X < 2] = \int_{-1}^{2} c e^{|x|} = 1 - \frac{1}{2}e^{-1} - \frac{1}{2}e^{-2}$

(3) $F(x) = \begin{cases} \frac{1}{2}e^{x} & x \le 0 \\ 1 - \frac{1}{2}e^{-x} & x > 0 \end{cases}$

联系方式：17883557844

32. $\int_0^\infty ax^1 e^{-x^2/2} \cdot 2$

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

(2) $f(x) = \begin{cases} 0 & x \le 0 \\ 1 - \frac{1}{2}x^2 e^{-\frac{x^2}{2}} - e^{-\frac{x^2}{2}} & x > 0 \end{cases}$

(3). $P\{-2 < X \le 6\} = 1 - e^{-8}$

35. $\xi^2 \le 4 \therefore \xi \in [-2, 4]$

$\therefore P = \frac{4}{9}$

36. $P = \begin{cases} e & x \le 0 \\ \lambda e^{-\lambda x} & x > 0 \end{cases}$ (1). $P = \int_0^{+\infty} \lambda e^{-\lambda x} = e^{-\lambda}$

(2) $P = \frac{\int_0^{+\infty} \lambda e^{-\lambda x}}{e^{-\frac{1}{2}}} = e^{-\frac{1}{2}}$.

(3) $P = b(n, e^{-\frac{1}{2}})$

联系方式：_____

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41. (1) $\mu=3$, $\sigma^2=4$, $\sigma=2$

$P(2<X<5) = F(5)-F(2)$

$= \Phi\left(\frac{5-\mu}{\sigma}\right) - \Phi\left(\frac{2-\mu}{\sigma}\right) \approx 0.3328$

(2). $P\{|X|>2\} = P\{X\in(-\infty,-2)\cup(2,+\infty)\}$

$= 1-P\{-2\le X\le 2\} \approx 0.6977$

(3). $C=3$

$F(d)=0.1$

$\Phi\left(\frac{d-\mu}{\sigma}\right)=0.1$

$\Phi\left(-\frac{d-\mu}{\sigma}\right)=0.9$

$\therefore d$ 至多为 0.44

42. (1). $\mu=70$

$F(60)=0.15=\Phi\left(\frac{60-\mu}{\sigma}\right) \quad \therefore \sigma=10.87$

(2). $P(X>65)=1-F(65)=1-\Phi\left(\frac{65-\mu}{\sigma}\right)$

$= \Phi\left(\frac{\mu-65}{\sigma}\right)=p.$

$P= C_5^3 p^3(1-p)^2$

联系方式：_____

46 $P\{|X-\mu|<\sigma\}$

$=2\Phi\left(\frac{\sigma}{\sigma}\right)-1$

$=2\Phi(1)-1$　∴ 不变

50. (1)

Y	$-\eta$	0	η
P	0.25	0.5	0.25

(2)

Y	-1	0	1
P	0.25	0.5	0.25

(3)

Y	0	1
P	0.5	0.5

53.

Y	0	1
P	0.5	0.5

57. $f(x) = e^{-x}$ $x>0$

$f(x) = 0$ $x<0$

(1) $f_{(Y)}(y) = f_{(X)}(h(y))\,|h'(y)|$

$= \begin{cases} 1/y^2, & y>1 \\ 0, & y\le 1 \end{cases}$

(2) $f_{(Y)}(y) = \begin{cases} \frac{1}{2\sqrt{y}} e^{-\sqrt{y}}, & y>0 \\ 0, & y\le 0 \end{cases}$

(3) $f_Y(y) = \begin{cases} 0 & y\le 0 \\ \frac{1}{2\sqrt{y}} e^{-2}(e^{-\sqrt{y}} + e^{\sqrt{y}}) & 0<y<4 \\ \frac{1}{2\sqrt{y}} e^{-2} e^{\sqrt{y}} & y\ge 4 \end{cases}$

59. $f_X(x) = \begin{cases} \frac{1}{\pi} & x \in (\frac{\pi}{2}, \frac{3}{2}) \\ 0 & \text{其它} \end{cases}$

$F_Y(y) = \begin{cases} \frac{2}{\pi\sqrt{1-y^2}}, & 0<y<1 \\ 0, & \text{其它} \end{cases}$