胡博闻 2016121518

49.

$$P(2X+1=k)=\begin{cases}0.1, & k=-1\\ 0.2, & k=1\\ 0.3, & k=3\\ 0.4, & k=5\end{cases}$$

$$p(X^2=k)=\begin{cases}0.2, & k=0\\ 0.4, & k=1\\ 0.4, & k=4\end{cases}$$

50.

$$F(x)=\begin{cases}0 & x\leqslant 0\\ 1-e^{-x} & x>0\end{cases}$$

$$\begin{aligned}G(y)&=P(Y\leqslant y)\\&=P(X^2\leqslant y)\\&=P(X\leqslant\sqrt{y})\\&=F(\sqrt{y})\end{aligned}$$

$$G(y)=\begin{cases}0 & y\leqslant 0\\ 1-e^{-\sqrt{y}} & y>0\end{cases}$$

$$P(Y)=\begin{cases}\frac{\sqrt{y}e^{-\sqrt{y}}}{2y} & y>0\\ 0 & y\leqslant 0\end{cases}$$

55.

$$p(x)=\begin{cases}\frac{1}{2\pi} & x\in[0,2\pi]\\ 0 & x\notin[0,2\pi]\end{cases}$$

$$F(x)=\begin{cases}0 & x\in(-\infty,0)\\ \frac{x}{2\pi} & x\in[0,2\pi]\\ 1 & x\in(2,+\infty)\end{cases}$$

$$\begin{aligned}G(y)&=P(Y\leqslant y)\\&=P(cosX\leqslant y)\\&=P(\arccos y\leqslant X\leqslant 2\pi-\arccos y)\end{aligned}$$

$$G(y)=\begin{cases}0 & y\in(-\infty,-1)\\ 1-\frac{\arccos y}{\pi} & y\in[-1,1]\\ 1 & y\in(1,+\infty)\end{cases}$$

$$p(y)=\begin{cases}\frac{1}{\pi\sqrt{1-y^2}} & y\in[-1,1]\\ 0 & y\notin[-1,1]\end{cases}$$

42.

$$p_1=\Phi(\frac{x-\mu}{\theta})=\Phi(-1)=1-\Phi(1)$$

$$p_2=1-\Phi(\frac{x-\mu}{\theta})=1-\Phi(1)=p_1$$

44.

$$\Delta=\sqrt{16-4X},p(X>4)=\frac{1}{2}=\Phi(0)$$

$$\mu=4$$

48.

$$F(X\leqslant 200)=\Phi(\frac{200-\mu}{\sigma})=1-\Phi(0.8)$$

$$F(X\leqslant 240)=\Phi(\frac{240-\mu}{\sigma})=\Phi(0.8)$$

$$\begin{aligned}\alpha&=(1-\Phi(0.8))\times 0.1+(2\Phi(0.8)-1)\times 0.001+(1-\Phi(0.8))\times 0.2\\&=0.0642\end{aligned}$$

$$\beta=\frac{(2\Phi(0.8)-1)}{\alpha}=0.009$$

54.

$$p(y)=\begin{cases}\frac{2}{\sqrt{2\pi}}e^{-\frac{y^2}{2}} & x>0\\ 0 & x\leqslant 0\end{cases}$$