1、

p_{ij}		X = 0	X = 1	X = 2	X = 3	$p_{\cdot j}=\sum_i p_{ij}$
Y	0	0	0	$\frac{3}{35}$	$\frac{2}{35}$	$\frac{1}{7}$
	1	0	$\frac{6}{35}$	$\frac{12}{35}$	$\frac{2}{35}$	$\frac{4}{7}$
	2	$\frac{1}{35}$	$\frac{6}{35}$	$\frac{3}{35}$	0	$\frac{2}{7}$
$p_{i\cdot}=\sum_j p_{ij}$		$\frac{1}{35}$	$\frac{12}{35}$	$\frac{18}{35}$	$\frac{4}{35}$	1

3. (1)

p_{ij}		X = 1	X = 2	$\cdots$	X = n-1	X = n	$p_{\cdot j}$
Y	1	0	$\frac{1}{n(n-1)}$	$\cdots$	$\frac{1}{n(n-1)}$	$\frac{1}{n(n-1)}$	$\frac{1}{n}$
	2	$\frac{1}{n(n-1)}$	0		$\frac{1}{n(n-1)}$	$\frac{1}{n(n-1)}$	$\frac{1}{n}$
	$\vdots$	$\vdots$		$\ddots$		$\vdots$	$\vdots$
	n-1	$\frac{1}{n(n-1)}$	$\frac{1}{n(n-1)}$		0	$\frac{1}{n(n-1)}$	$\frac{1}{n}$
	n	$\frac{1}{n(n-1)}$	$\frac{1}{n(n-1)}$	$\cdots$	$\frac{1}{n(n-1)}$	0	$\frac{1}{n}$
$p_{i\cdot}$		$\frac{1}{n}$	$\frac{1}{n}$	$\cdots$	$\frac{1}{n}$	$\frac{1}{n}$	1

(2)

p_{ij}		X = 1	X = 2	X = 3	$p_{\cdot j}$
Y	1	0	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{3}$
	2	$\frac{1}{6}$	0	$\frac{1}{6}$	$\frac{1}{3}$
	3	$\frac{1}{6}$	$\frac{1}{6}$	0	$\frac{1}{3}$
$p_{i\cdot}$		$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	1

4.

p_{ij}	Y_1: 0	1	2	$p_{\cdot j}$
Y_2: -1	0	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{2}{3}$
1	$\frac{1}{3}$	0	0	$\frac{1}{3}$
$p_{i\cdot}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	1

Y_1	0	1	2
P	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$

Y_2	-1	1
P	$\frac{2}{3}$	$\frac{1}{3}$

5.(1) $\int_0^{+\infty}\int_0^{+\infty} ke^{-2x-4y}\,dx\,dy = 1 \Rightarrow K=8$

(2) $P(0\le X\le 2, 0<Y\le 1) = \int_0^2\int_0^1 8e^{-2x-4y}\,dx\,dy$

$=(e^{-4}-1)^2 = 0.9637$

(3) $P(X+Y<1) = \int_0^1 dx\int_0^{1-x} 8e^{-2x-4y}\,dy = 1-2e^{-2}+e^{-4}$

(4) 当x或y不全大于0时 $F(x,y)=0$

当 $x>0, y>0$ 时 $F(x,y)=\int_0^y\int_0^x 8e^{-2x-4y}\,dy\,dx =$

$1+e^{-2x-4y}-e^{-4y}-e^{-2x} = (1-e^{-4y})(1-e^{-2x})$

6. $P(X>100, Y>100) = 1-P(X\le 100)-P(Y\le 100)+P(X<100, Y<100)$

$F_X(x)=F(x,+\infty)=1-e^{-0.01x},\ x\ge 0$

$F_Y(y)=F(+\infty,y)=1-e^{-0.01y},\ y\ge 0$

$\therefore$ 上式 $=1-(1-e^{-1})-(1-e^{-1})+(1-e^{-1}\times 2+e^{-2})$

7. (1) $\int_0^2 dx\int_0^{\frac{x}{2}} kx\,dy = \frac{4}{3}k=1,\ k=\frac{3}{4}$

(2) $P(X+Y\le 2) = \int_0^{\frac{2}{3}} dy\int_{2y}^{2-y}\frac{3}{4}x\,dx = \frac{5}{9}$

(3) $f_X(x) = \int_{-\infty}^{\infty} f(x,y)\,dy$

当 x 不在 $[0,2]$ 时，$f_X(x)=0$，当 $x\in[0,2]$ 时

$f_X(x)=\int_0^{\frac{x}{2}}\frac{3}{4}x\,dy = \frac{3}{8}x^2$

$\frac{21}{8}x^2y^2\Big|_{x^2}^{1}$ $\frac{3}{8}x^2$ $\frac{3}{4}$ $\frac{21}{12}$ $\frac{7}{4}x^3y\Big|_{-\sqrt{y}}^{\sqrt{y}}$ $\frac{21}{8}x^2y^2\Big|$

$f_Y(y)=\int_{-\infty}^{\infty}f(x,y)dx$，当 $y\notin[0,1]$ 时，$f_Y(y)=0$

当 $y\in[0,1]$ 时，$f_Y(y)=\int_{2y}^{2}\frac{3}{4}x\,dx=\frac{3}{2}-\frac{3}{2}y^2$

8.(1) $f_X(x)=\int_{-\infty}^{\infty}f(x,y)dy$

当 $x\notin[-1,1]$ 时 $f_X(x)=0$

当 $x\in[-1,1]$ 时，$f_X(x)=\int_{x^2}^{1}\frac{21}{4}x^2y\,dy=\frac{21}{8}x^2-\frac{21}{8}x^4$

$f_Y(y)=\int_{-\infty}^{\infty}f(x,y)dx$

当 $y\notin[0,1]$ 时，$f_Y(y)=0$

当 $y\in[0,1]$ 时，$f_Y(y)=\int_{-\sqrt{y}}^{\sqrt{y}}\frac{21}{4}x^2y\,dx=\frac{7}{2}y^{\frac{5}{2}}$

(2) $P(X\geq Y)=\int_0^1dx\int_{x^2}^{x}\frac{21}{4}x^2y\,dy=\frac{3}{20}$