1)

	Y^2	1	4	9	16	25		
X^2		1	2	3	4	5		
1	1	0.1	0.04	0.08	0.08	0.06	0.36	
4	2	0.09	0.05	**0.03**	0.05	0.02	0.24	
9	3	0.02	0.05	0.02	0.05	0.04	0.18	
16	4	0.03	0.02	0.07	0.04	0.06	0.22	
		0.24	0.16	0.2	0.22	0.18		

XY				
1	**2**	**3**	**4**	**5**
2	**4**	**6**	**8**	**10**
3	**6**	**9**	**12**	**15**
4	**8**	**12**	**16**	**20**

E(X)= 2.26
E(Y)= 2.94

E(XY)= 6.90

Cov(X,Y)= E(XY)-E(X)E(Y)
0.2556

E(X^2)= 6.46

V(X)= $E(X^2)-[E(X)]^2$
1.3524 Sx= 1.162927

E(Y^2)= 10.7

V(Y)= $E(Y^2)-[E(Y)]^2$
2.0564 Sy= 1.434015

Corr(X,Y)= Cov(X,Y) / ($S_X S_Y$)

0.153269

p(X|Y=4)= 0.364 , x=1
0.227 , x=2
0.227 , x=3
0.182 , x=4

E(X|Y=4)= 2.227

2)

$$\boxed{C\int_{y=0}^{3}\int_{x=2}^{4}(10-x-y)\,dx\,dy=1.0}$$

$$\boxed{\int_{y=0}^{3}\int_{x=2}^{4}(10-x-y)\,dx\,dy=33.0}$$

C=1/33= 0.030303

b)

$$\boxed{\frac{1}{33}\int_{y=0}^{3}(10-x-y)\,dy=\frac{1}{33}(30-3x-\frac{9}{2}),\quad 2\le x\le 4}$$

c)

$$\boxed{E(X)=\frac{1}{33}\int_{x=2}^{4}(30-3x-\frac{9}{2})\,dx=2.9394}$$

$$f(x, y) = c \cdot (10 - x - y)$$

$$2 \leq x \leq 4$$

$$0 \leq y \leq 3$$

$$f_X(x) = \int_{R_y} f(x, y)\, dy$$

$$f_X(x) = c \int_0^3 (10 - x - y)\, dy$$

$$f_Y(y) = c \int_2^4 (10 - x - y)\, dx$$

$E(X \mid Y) \Rightarrow$ 1st find the conditional pr.

$$\underbrace{f(X \mid Y)} = \frac{f(x, y)}{f_Y(y)} \Rightarrow \text{plug-in } y = 2$$

$$E(X \mid Y = 2) = \int_2^4 x \cdot f(x \mid y = 2)\, dx$$

$$f_y(y) = c\int_2^4 (10-x-y)\,dx$$

$$= c\left(10x - \frac{x^2}{2} - xy\right)\Big|_2^4$$

$$= c\left[(40-8-4y)-(20-2-2y)\right]$$

$$1/33 = c\left[14-2y\right] = f_y(y)$$

$$f(x|y) = \frac{f(x,y)}{f_y(y)} = \frac{\cancel{c}.(10-x-y)}{\cancel{c}[14-2y]}$$

$$E(x|y)_{y=2} = \int_2^4 x.\frac{(10-x-y)}{(14-2y)}$$

$$= \int_2^4 x.\frac{(8-x)}{(10)} = 1/10\int_2^4 8x-x^2$$

$$\boxed{10} \quad = 1/10\left(4x^2 - \frac{x^3}{3}\right)_2^4 \quad \frac{1}{10}\left[\left(64-\frac{64}{3}\right) - \left(16-\frac{8}{3}\right)\right]$$

$$\frac{1}{10}\left[\left(64-\frac{64}{3}\right)-\left(16-\frac{8}{3}\right)\right]$$

$$1/10\left[\left(\frac{2\times 64}{3}\right)-\left(\frac{5\times 8}{3}\right)\right]$$

$$\boxed{\frac{88}{30}}$$

3)

X~N(125.50, 49)

a) n=7

Sample mean, $\boxed{\bar{X}}$ ~N(125.50, 49/7)
~N(125.50, 7)

b)
n=14 Sample mean, $\boxed{\bar{\bar{X}}}$ ~N(125.50, 49/14)
~N(125.50, 3.5)

c) for part a)

$$\boxed{P(122 \le \bar{X} \le 129) = P(\frac{122-125.50}{\sqrt{7}} \le Z \le \frac{129-125.50}{\sqrt{7}}) = P(-1.32 \le Z \le 1.32) = \phi(1.32) - \phi(-1.32) = 0.9066 - 0.0934 = 0.8132}$$

for part b)

$$\boxed{P(122 \le \bar{X} \le 129) = P(\frac{122-12550}{\sqrt{3.5}} \le Z \le \frac{129-12550}{\sqrt{3.5}}) = P(-1.87 \le Z \le 1.87) = \phi(1.87) - \phi(-1.87) = 0.9693 - 0.0307 = 0.9386}$$