#5-1

(a) $P(X=3 \text{ and } Y=30) = \frac{7M}{100M} = \boxed{0.07}$

(b)

X	0	1	2	3
p(x)	A	B	C	D

$A = (1M + 2M + 5M)/100M = \boxed{0.08}$

$B = (3M + 6M + 10M)/100M = \boxed{0.19}$

$C = (18M + 21M + 15M)/100M = \boxed{0.54}$

$D = (7M + 8M + 4M)/100M = \boxed{0.19}$

Y	30.	45	70.
p(y)	A	B	C

$A = (1M + 3M + 18M + 7M)/100M = \boxed{0.29}$

$B = (2M + 6M + 21M + 8M)/100M = \boxed{0.37}$

$C = (5M + 10M + 15M + 4M)/100M = \boxed{0.34}$

(c) $p(x,y) \stackrel{?}{=} p(x)\,p(y)$

Pick $X=3$ and $Y=30$. $p(3,30) = 0.07$

$p(3) = 0.19$, $p(30) = 0.29$

So $p(3)p(30) = (0.19)(0.29) = 0.0551$

$\therefore$ X and Y are **NOT independent**

(d) $\mu_X = 0(0.08) + 1(0.19) + 2(0.54) + 3(0.19) = \boxed{1.84}$

$\sigma_X = \sqrt{(0-1.84)^2(0.08) + (1-1.84)^2(0.19) + (2-1.84)^2(0.54) + (3-1.84)^2(0.19)}$

$= \boxed{0.8212}$

(e)