1. An instructor has given a short test consisting of two parts. For a randomly selected student, let X = the number of points earned on the first part and Y = the number of points earned on the second part. Suppose that the joint pmf of X and Y is given in the accompanying table.

Value of
$$p(x,y) = P(x=x,Y=y)$$

		y				
p(x, y)		0	5	10	15	
	0	.02	.06	.02	.10	€ 0.20
X	5	.04	.15	.20	.10	£ 0.49
	10	.01	.15	.14	.01	£ 0.30 £ 0.49 £ 0.31

£ 0.07 £ 0.36 £ 0.36 £ 0.21

(a) Obtain marginal pmf of X.

$$P(0) = 0.07$$

(b) Obtain marginal pmf of Y.

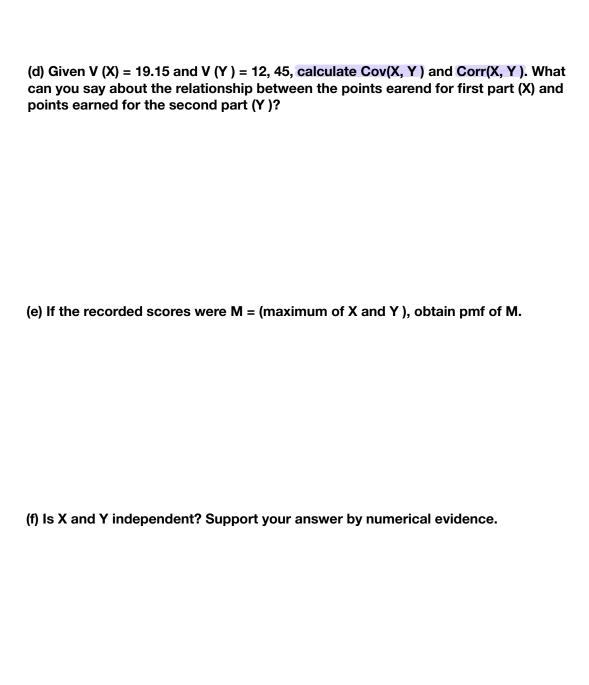
$$p(0) = 0.2$$

(c) What is E(X), E(Y) and E(XY)?

$$E(x) = 0(0.7) + 5(0.36) + 10(0.36) + 15(0.21) = 8.55$$

$$E(Y) = 0(0.2) + 5(0.44) + 10(0.31) = 5.55$$

$$E(XY) = (5)\cdot(s)(0.15) + (5)\cdot(10)\cdot(0.15+0.2)$$



2. Let r.v. X and Y have joint pdf

$$f(x,y) = \begin{cases} \frac{1}{54}(x+y) & \text{for } 0 \le x \le 3 \text{ and } 1 \le y \le 5 \\ 0 & \text{Otherwise} \end{cases}$$

(a) Obtain marginal pdf of X.

$$=\frac{4}{54}x+\frac{12}{54}$$

$$f(x) = \int_{-\infty}^{\infty} f(x,y) dx = \int_{1}^{5} \frac{1}{5y} (x+y) dy \rightarrow \int_{1}^{5} \frac{1}{5y} x + \frac{1}{5y} y dy \rightarrow$$

$$f(x) = \frac{4}{54} \times + \frac{12}{54}$$

(b) Calculate E(X).

$$E(x) = \int_{-\infty}^{\infty} x f(x) dx = \int_{0}^{9} x \left(\frac{4}{54} x + \frac{12}{54} \right) dx = \left[\frac{4}{54} \left(\frac{x^{3}}{2} \right) + \frac{12}{54} \left(\frac{x^{2}}{2} \right) \right]_{0}^{3} = 1.67$$

(c) Calculate P

(d) Calculate E(XY)