

Group Work 5.1-5.3

$$1a. 1 = c(1^2+0^2) + c(1^2+1^2) + c(1^2+2^2) + c(2^2+0^2) + c(2^2+1^2) + c(2^2+2^2)$$

$$1 = c + 2c + 5c + 4c + 5c + 8c$$

$$1 = 25c \rightarrow \boxed{c = \frac{1}{25}}$$

$$b. P(X \geq Y) = c(1^2+0^2) + c(2^2+0^2) + c(2^2+1^2)$$

$$= c + 4c + 5c$$

$$= \boxed{\frac{10}{25}}$$

$$c. P_X(x) = \begin{cases} \frac{8}{25} & x=1 \\ \frac{17}{25} & x=2 \\ 0 & \text{otherwise} \end{cases} \quad P_Y(y) = \begin{cases} \frac{5}{25} & y=0 \\ \frac{7}{25} & y=1 \\ \frac{13}{25} & y=2 \\ 0 & \text{otherwise} \end{cases}$$

$$2a. P(X \geq 1 \text{ \& } Y < 2) = 0.17 + 0.23 + 0.06 + 0.15 = \boxed{0.61}$$

$$b. g(X, Y) = X + Y = E[X] + E[Y]$$

$$E[X] = 0 \cdot 0.25 + 1 \cdot 0.48 + 2 \cdot 0.27 = 1.02$$

$$E[Y] = 0 \cdot 0.32 + 1 \cdot 0.49 + 2 \cdot 0.19 = 0.87$$

$$\boxed{g(X, Y) = 1.89}$$