1) Let $X_1, X_2 \sim f_{X_1X_2}(t_1, t_2)$. The joint probability mass function of X_1 and X_2 is given in Table 1.2.1.

t_2 \ t_1	1	2	3	4	5	$f_{X_2}(t_2)$
1	0.02	0.05	0.05	0.07	0.06	k
2	0.05	0.02	0.05	0.05	0.08	k
3	0.02	0.05	0.05	0.08	0.05	k
4	0.12	0.08	0.03	0.01	0.01	k
$f_{X_1}(t_1)$	a	0.20	0.18	b	c	1

Table 1.2.1: Joint PMF of X_1 and X_2.

Choose the correct options from the following:

- ☑ $f_{X_1}(1) = 0.21$
- ☑ $a + b + c = 0.62$
- ☐ $a + b + c = 0.41$
- ☑ $k = 0.25$

$f_{X_1}(1) = 0.02 + 0.05 + 0.02 + 0.12$
$\Rightarrow 0.21$

$a + 0.20 + 0.18 + b + c = 1$
$\Rightarrow a + b + c = 1 - 0.38$
$\Rightarrow 0.62$

$k + k + k + k = 1$
$\Rightarrow 4k = 1$
$\Rightarrow k = 0.25$

2) If $X, Y \sim f_{XY}(t_1, t_2)$, select the correct statements from the following:

- ☐ $f_X(t_1) = \sum_{t_1 \epsilon T_y} f_{XY}(t_1, t_2)$
- ☑ $f_X(t_1) = \sum_{t_2 \epsilon T_y} f_{XY}(t_1, t_2)$ Fix t_1, sum over t_2
- ☑ $f_Y(t_2) = \sum_{t_1 \epsilon T_X} f_{XY}(t_1, t_2)$ Fix t_2, sum over t_1
- ☐ $f_Y(t_2) = \sum_{t_2 \epsilon T_X} f_{XY}(t_1, t_2)$

3) The joint probability mass function of two discrete random variables X and Y is given by

$f_{XY}(x, y) = \frac{xy}{9}, \quad x, y \in \{1, 2\}$

Calculate $f_X(1) + f_X(2)$.

$$f_{x,y}(x,y) = \frac{xy}{9}$$

$$f_x(1) = \frac{(1)(1)}{9} + \frac{(1)(2)}{9} \Rightarrow \frac{3}{9}$$

$$f_x(2) = \frac{(2)(1)}{9} + \frac{(2)(2)}{9} \Rightarrow \frac{6}{9}$$

$$\Rightarrow f_x(1) + f_x(2) = \frac{3}{9} + \frac{6}{9} = \boxed{\frac{9}{9}}$$