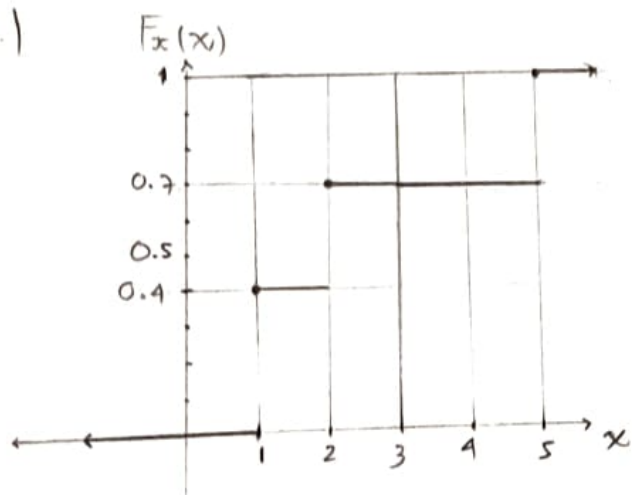2.)

$$F_x(x) = \begin{cases} 0 & x < 1 \\ 0.4 & 1 \le x < 2 \\ 0.7 & 2 \le x < 5 \\ 1 & x \ge 5 \end{cases}$$

a.)

$F_x(x)$

0.7
0.5
0.4
1 2 3 4 5 x

b) $R_x = \left\{ x \in \mathbb{R} \,/\, P_x(x) \ne 0 \right\}$

$R_x = \left\{ x \ge 1 \right\}$

$P_x(x) = P(x = x) = F_x(x) - F_x(x^-)$.

$P_x(1) = P(x = 1) = 0.4 - 0 = 0.4$

$P_x(2) = P(x = 2) = 0.7 - 0.4 = 0.3$

$P_x(3) = P(x = 3) = 0.7 - 0.4 = 0.3$

$P_x(4) = P(x = 4) = 0.7 - 0.4 = 0.3$

$P_x(5) = P(x = 5) = 1 - 0.7 = 0.3$

X	1	2	3	4	5
$P_x(x)$	0.4		0.3		0.3

c.)

- $P(1.5 \le x \le 5) = P(2 \le x \le 5)$

$P(1.5 < x \le 5) = P(x = 2) + P(2 < x \le 5)$

$P(1.5 < x \le 5) = P(x = 2) + F_x(5) - F_x(2)$

$P(1.5 < x \le 5) = F_x(2) - F_x(2^-) + F(5) - F_x(2)$

$P(1.5 < x \le 5) = F_x(5) - F_x(2^-)$

$P(1.5) < x \le 5) = 1 - 0.4 = 0.6$

- $P(1 < x < 5) = P(1 < x \le 4)$

$P(1 < x < 5) = F_x(4) - F_x(1)$

$P(1 < x < 5) = 0.7 - 0.4$

$P(1 < x < 5) = 0.3$.

- $P(x \ge 2) = P(x = 2) + P(x > 2)$

$P(x \ge 2) = F_x(2) - F_x(2^-) + (1 - F_x(2))$

$P(x \ge 2) = 1 - F_x(2^-)$

$P(x \ge 2) = 1 - 0.4 = 0.6$.