

$$m_2 = E(x^2) = \frac{d^2 M_x(t)}{dt^2} \bigg|_{t=0}$$

$$m_2 = \frac{(2-e^t)^2 \cdot 2e^t - [2e^t \cdot 2(2-e^t) \cdot (-e^t)]}{(2-e^t)^4}$$

$$m_2 = \frac{2e^t}{(2-e^t)^2} + \frac{4e^{2t}(2-e^t)}{(2-e^t)^3} \bigg|_{t=0}$$

$$m_2 = \frac{2}{1} + \frac{4 \cdot 2}{1} = 6$$

$$= \frac{2}{1} + \frac{8}{1} = \frac{10}{1}$$

$$\frac{2e^0}{(2-e^0)^2} = \frac{2}{1}$$

$$\frac{4e^0}{(2-e^0)^3} = \frac{4}{1}$$

$$\begin{aligned} \text{Var}(X) &= E(x^2) - \{E(x)\}^2 \\ &= 6 - (2)^2 = 2 \\ &= 6 - 4 = \boxed{2} \end{aligned}$$

Q₁) The r.v. X be the number of white balls if we drawn a sample of size (2) balls from an Urn Contains 4 white and 3 red balls, Find

- 1) p.m.f. of X and graph it
- 2) C.D.F. of X and graph it
- 3) $\Pr(1 \leq X \leq 3)$
- 4) $\Pr(1.5 \leq X \leq 3.5)$

Q₂) If X be a random Variable with p.m.f. defined as:-

$$p(x) = \frac{1}{n}, \quad x = 1, \dots, n$$

Find m_r , M_r when $r = 0, 1, 2$

Q₃) If r.v. X have p.d.f. defined as

$$f(x) = 3(1-x)^2, \quad 0 < x < 1$$

Find ① $E(x)$

2) $V(x)$

3) $\text{Var}(-14X + 1)$

4) $V(X - 3)$

شرف احمد کریم