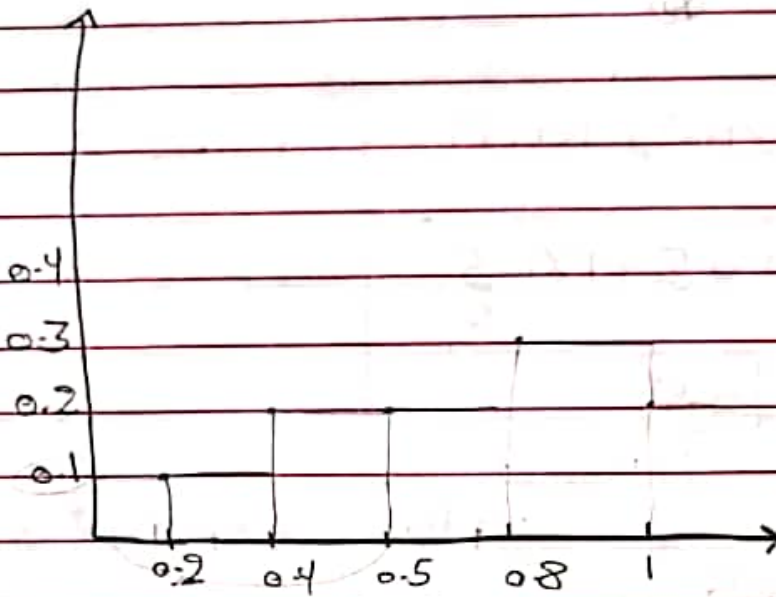


Home Work - Session (3)

①

③



⑥ $P(X \leq 0.5)$

$$P(X=0.2) + P(X=0.4) + P(X=0.5)$$

$$= 0.1 + 0.2 + 0.2 = \boxed{0.5}$$

⑦ ~~P(X)~~ $P(0.25 < X < 0.75)$ between 0.25, 0.75

$$P(X=0.4) + P(X=0.5)$$

$$= 0.2 + 0.2$$

$$= \boxed{0.4}$$

②

$$P_k(k) = \begin{cases} 0.1 & \text{for } k=0 \\ 0.4 & \text{for } k=1 \\ 0.3 & \text{for } k=2 \\ 0.2 & \text{for } k=3 \\ 0 & \text{otherwise} \end{cases}$$

$$a) E[X] = \sum(x) \cdot P(x)$$

$$= 0 \times 0.1 + 1 \times 0.4 + 2 \times 0.3 + 3 \times 0.2$$

$$= 0 + 0.4 + 0.6 + 0.6$$

$$= \boxed{1.6}$$

$$b) \text{Var}(X) = \sum(x - \mu)^2 \cdot P(x)$$

$$= (0 - 1.6)^2 \times 0.1 + (1 - 1.6)^2 \times 0.4 + (2 - 1.6)^2 \times 0.3$$

$$+ (3 - 1.6)^2 \times 0.2$$

$$= \boxed{0.84}$$

أو نحسبها حسب القانون ده

$$\text{Var}(X) = E(X^2) - E(X)^2$$

$$\rightarrow E(X^2) = 0^2 \times 0.1 + 1^2 \times 0.4 + 2^2 \times 0.3 + 3^2 \times 0.2$$

$$= 3.4$$

$$\text{Var}(X) = 3.4 - (1.6)^2$$

$$= \boxed{0.48}$$

② $y = (x-2)^2$, Find $E[y]$

$$E[y] = E[(x-2)^2]$$

$$= E[x^2 - 4x + 4]$$

$$= E[x^2] - E[4x] + E[4]$$

شرط الثابت بتابع

$$= E[x^2] - 4E[x] + 4$$

$$= 3 \cdot 4 - 4 \times 1.6 + 4$$

$$= \boxed{1}$$

③ x and y are Independent Variable

$$\text{Var}(2x-y) = 6, \text{Var}(x+2y) = 9$$

$$\text{Var}(2x-y) = 6$$

$$\rightarrow (-1)^2$$

$$2^2 \text{Var}(x) + \text{Var}(y) = 6$$

هو نفس السؤال اللي قبلها بتاع $E(x)$

بسي هو عشان Var هحتاج
نخرج المعادلات

$$\boxed{4 \text{Var}(x) + \text{Var}(y) = 6} \quad ①$$

هو قاعدة ماحه لحي

$$\text{Var}(X+2Y) = 9$$

$$\text{Var}(X) + 2^2 \text{Var}(Y) = 9$$

$$\boxed{\text{Var}(X) + 4 \text{Var}(Y) = 9} \quad (2)$$

$$4 \text{Var}(X) + \text{Var}(Y) = 6$$

$$-4 \times \text{Var}(X) + 4 \text{Var}(Y) = 9$$

$$4 \text{Var}(X) + \text{Var}(Y) = 6$$

$$-4 \text{Var}(X) - 16 \text{Var}(Y) = -36$$

$$-15 \text{Var}(Y) = -30$$

$$\boxed{\text{Var}(Y) = 2}$$

$$4 \text{Var}(X) + 2 = 6 \rightarrow \boxed{\text{Var}(X) = 1}$$

$$(4) \quad P = \binom{10}{5} (0.25)^5 (0.75)^5 = 0.058 \rightarrow P(18)$$

$$P(16) = 0.016, \quad P(17) = 0.0038$$

$$P(18) = 0.0003, \quad P(19) = 0.00002$$

$$P(20) = 0.0000009$$

$$P(X > 15) \approx 0.019$$

$$(5) \quad \lambda = 10 / h \quad \text{for } 10 \text{ pm} : 11 \text{ pm}$$

$$P(k) = \frac{\lambda^k e^{-\lambda}}{k!}$$

$$\lambda = 10 \times 1.5 = 15$$

$$P(11) = 0.066$$

$$P(12) = 0.08$$

$$P(13) = 0.09$$

$$P(14) = 0.10$$

$$P(15) = 0.10$$

$$P(10 < X \leq 15) = P(11) + P(12) + P(13) + P(14) + P(15)$$

$$= 0.066 + 0.08 + 0.09 + 0.1 + 0.1$$

$$\approx 0.44$$



$$\textcircled{6} \quad P(X=5) = P(5)^+ - P(5)^- = 0.9 - 0.7 = \boxed{0.2}$$

$$P(2 < X < 5) = P(5) - P(2)$$

$$= 0.7 - 0.2$$

$$= \boxed{0.5}$$

$$P(X \geq 3) = 1 - P(X \leq 3)$$

$$= 1 - 0.2$$

$$= \boxed{0.8}$$

⑦ mean of Binomial dis —

is $n \cdot p$

Variance is $n \cdot p \cdot (1 - p)$