Java 6

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①

$$X = \begin{bmatrix} 6 & 7 & 8 & 9 \\ 0{,}29 & 0{,}06 & 0{,}44 & 0{,}21 \end{bmatrix} \qquad y = X^2 - 1$$

$$y = \{35, 48, 63, 80\}$$

$$y = \begin{Bmatrix} 35 & 48 & 63 & 80 \\ 0{,}29 & 0{,}06 & 0{,}44 & 0{,}21 \end{Bmatrix}$$

②

$$Z = 2X - y$$

$$X = \begin{bmatrix} 2 & -1 & 0 \\ \frac{2}{4} & \frac{1}{4} & \frac{1}{4} \end{bmatrix} \qquad y = \begin{bmatrix} 1 & 3 & -2 \\ \frac{2}{5} & \frac{1}{5} & \frac{2}{5} \end{bmatrix}$$

$$Z = 2X - y = \left\{ \overset{2,1}{3}, \overset{-1,1}{-3}, \overset{0,1}{-1}, \overset{2,3}{1}, \overset{1,3}{-5}, \overset{2,-2}{6}, \overset{-1,-2}{0}, \overset{0,-2}{2} \right\}$$

$$P(X=3) = P(X=2, y=1) = \frac{2}{4} \cdot \frac{2}{5} = \frac{4}{20} = \frac{1}{5}$$

$$P(X=-3) = P(-1,1) = \frac{1}{4} \cdot \frac{1}{5} = \frac{1}{20}$$

$$P(0,3) = \frac{1}{4} \cdot \frac{2}{5} = \frac{1}{20}$$

$$P(X=-3) = \frac{2}{20} + \frac{1}{20} = \frac{2+1}{20} = \frac{3}{20}$$

$$P(X=-1) = P(x=0, y=1) = \frac{1}{4} \cdot \frac{2}{5} = \frac{2}{20}$$

$$P(X=1) = P(x=2, y=3) = \frac{2}{4} \cdot \frac{1}{5} = \frac{2}{20}$$

$$Z = \begin{bmatrix} 3, & -3, & -1 & 1 & -5 & 6 & 0 & 2 \\ \frac{4}{20} & \frac{3}{20} & \frac{2}{20} & \frac{2}{20} & \frac{1}{20} & \frac{4}{20} & \frac{2}{20} & \frac{2}{20} \end{bmatrix}$$

③ Pritja Matematike :

$$E(X) = x_1 \cdot p_1 + x_2 \cdot p_2 + x_3 p_3 + \dots + x_n \cdot p_n$$

$$X = \begin{bmatrix} 8 & 9 & 10 \\ 0{,}2 & 0{,}7 & 0{,}1 \end{bmatrix} \qquad Y = \begin{bmatrix} 8 & 9 & 10 \\ 0{,}3 & 0{,}5 & 0{,}2 \end{bmatrix}$$

$$E(X) = 8 \cdot 0{,}2 + 9 \cdot 0{,}7 + 10 \cdot 0{,}1 = 1{,}6 + 6{,}3 + 1 = 8{,}9$$

$$E(Y) = 8 \cdot 0{,}3 + 9 \cdot 0{,}5 + 10 \cdot 0{,}2 = 2{,}4 + 4{,}5 + 2 = 8{,}9$$

$$D(X) = E(X^2) - [E(X)]^2$$

$$E(X^2) = 8^2 \cdot 0{,}2 + 9^2 \cdot 0{,}7 + 10^2 \cdot 0{,}1 = 12{,}8 + 56{,}7 + 10 = 79{,}5$$

$$E(Y^2) = 8^2 \cdot 0{,}3 + 9^2 \cdot 0{,}5 + 10^2 \cdot 0{,}2 = 19{,}2 + 40{,}5 + 20 = 79{,}7$$

$$D(X) = 79{,}5 - (8{,}9 \cdot 8{,}9) = 79{,}21 = 0{,}29$$

$$D(Y) = 79{,}7 - 79{,}21 = 0{,}49$$

$$D(X) < D(Y)$$

W

④ $P(H) = \frac{2}{3} = p \quad n = 4$

$$\boxed{C_n^x = p^x \cdot q^{n-x}}$$

$P(\bar{H}) = 1 - \frac{2}{3} = \frac{1}{3} = q$

$$P(x=2) = C_4^2 \cdot p^2 \cdot q^2 = \frac{4!}{2! \cdot 2!} \cdot \left(\frac{2}{3}\right)^2 \cdot \left(\frac{1}{3}\right)^2 =$$

$$= \frac{4 \cdot 3 \cdot \cancel{2!}}{\cancel{2!}\ 2 \cdot 1} \cdot \frac{4}{9} \cdot \frac{1}{9} =$$

$$= \frac{6}{1} \cdot \frac{4}{81} = \frac{24}{81}$$

⑥ $n = 4 \quad p = 0{,}4 \quad q = 1 - 0{,}4 = 0{,}6$

I) $p(X \leq 2) = P(X=1) + P(X=2) = 0{,}3456 + 0{,}3456 = 0{,}6912$

$P(X=1) = C_4^1 \cdot p^1 \cdot q^{4-1} = \frac{4!}{1! \cdot (3!)} \cdot 0{,}4 \cdot (0{,}6)^3 =$

$= \frac{\cancel{4} \cdot \cancel{3!}}{\cancel{3!}} = 0{,}216$

$P(X=2) = C_4^2 \cdot p^2 \cdot q^2 = \frac{4!}{2! \cdot 2!} \cdot (0{,}4)^2 \cdot (0{,}6)^2 =$

$= \frac{4 \cdot 3 \cdot 2!}{2! \cdot 2} \cdot 0{,}16 \cdot 0{,}36$

II) $P(X=3) \quad C_4^3 \cdot p^3 \cdot q^1 = \frac{4!}{3! \cdot 1!} = \frac{4 \cdot \cancel{3!}}{\cancel{3!}} \cdot 0{,}4^3 \cdot 0{,}6 =$

$= 4 \cdot 0{,}064 \cdot 0{,}6 = 0{,}1536$

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$P(V) = 0{,}6 = p \quad n = 6 \qquad q = 1 - 0{,}6 = 0{,}4$

a)

$$P(X=3) = C_6^3 \cdot (0{,}6)^3 \cdot (0{,}4)^3 = \frac{6!}{3!\,3!} \cdot 0{,}6^3 \cdot 0{,}4^3 =$$

$$= \frac{\cancel{6} \cdot 5 \cdot 4 \cdot \cancel{3!}}{\cancel{3} \cdot 2 \cdot \cancel{3!}} \cdot 0{,}216 \cdot 0{,}64 =$$

$$= 20 \cdot 0{,}216 \cdot 0{,}064 =$$

$$= 0{,}27648$$

b) $P(X>3) = P(X=4) + P(X=5) + (X=6)$

$$P(X=4) = C_6^4 \cdot 0{,}6^4 \cdot 0{,}4^2 = \frac{6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!} \cdot 2!} \cdot 0{,}1236 \cdot 0{,}16 =$$

$$= 0{,}31104$$

$$P(X=5) = C_6^5 \cdot 0{,}6^5 \cdot 0{,}4 = \frac{6 \cdot \cancel{5}}{\cancel{5}! \cdot 1!} = 0{,}07776 \cdot 0{,}4 =$$

$$= 0{,}186624$$

$$P(X=6) = C_6^6 \cdot 0{,}6^6 \cdot 1 \quad \frac{6!}{6!(6-6)} = 0$$

$$P(X>3) = 0{,}31104 + 0{,}186624 + 0 = 0{,}497664$$