Related Problem with Solution :

Q) If the mean and the variance of a binomial variate X are 2 and 1 respectively, then probability that X takes a value greater than or equal to one is

Soln :

For binomial distribution,

Mean $= np = 2$ ....(1)

Variance $= npq = 1$

$\Rightarrow 2q = 1$

$\Rightarrow q = \dfrac{1}{2}$

$\Rightarrow p = \dfrac{1}{2}$ $(\because p + q = 1)$

$\Rightarrow n = 4$

Now, $P(X \geq 1) = 1 - P(X = 0)$

$= 1 - {}^4C_0 \left(\dfrac{1}{2}\right)^0 \left(\dfrac{1}{2}\right)^4$

$= 1 - \dfrac{1}{16}$

$= \dfrac{15}{16}$