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$$\frac{{}^5C_2\underbrace{\left(\frac{5!}{(1!)^2\,3!\,2!}\times 3! + \frac{5!}{1!\,(2!)^2\,2!}\times 3!\right)}_{3^5-\left({}^3C_1\,2^5-{}^3C_2\,1^5\right)}}{5^5}$$

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1. If the mean and SD of a binomial variate X are 9 and $\frac{3}{2}$ respectively. Find the probability that X takes a value greater than 1.

$$np = 9$$

$$nqp = \frac{9}{4}$$

$$q = \frac{1}{4},\ p = \frac{3}{4},\ n = 12$$

$$P(X>1) = 1 - P(X=0 \text{ or } 1) = 1 - \left(\left(\frac{1}{4}\right)^{12} + {}^{12}C_1\left(\frac{3}{4}\right)\left(\frac{1}{4}\right)^{11}\right)$$

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2: The probability that coin lands on heads is $\frac{3}{5}$. The coin is flipped 150 times. Find the

(i) expected no. of heads. $\longrightarrow$ $\mu = np = 150 \times \frac{3}{5} = 90$.

(ii) variance on no. of heads $= npq = 150 \times \frac{3}{5} \times \frac{2}{5} = 36$

(iii) probability that there is between 90 and 100 heads.

$$P(X = 91, 92, \ldots, 99) = {}^{150}C_{91}\left(\frac{3}{5}\right)^{91}\left(\frac{2}{5}\right)^{59} + {}^{150}C_{92}\left(\frac{3}{5}\right)^{92}\left(\frac{2}{5}\right)^{58} + \cdots + {}^{150}C_{99}\left(\frac{3}{5}\right)^{99}\left(\frac{2}{5}\right)^{51}.$$

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Ex-3 (DE)

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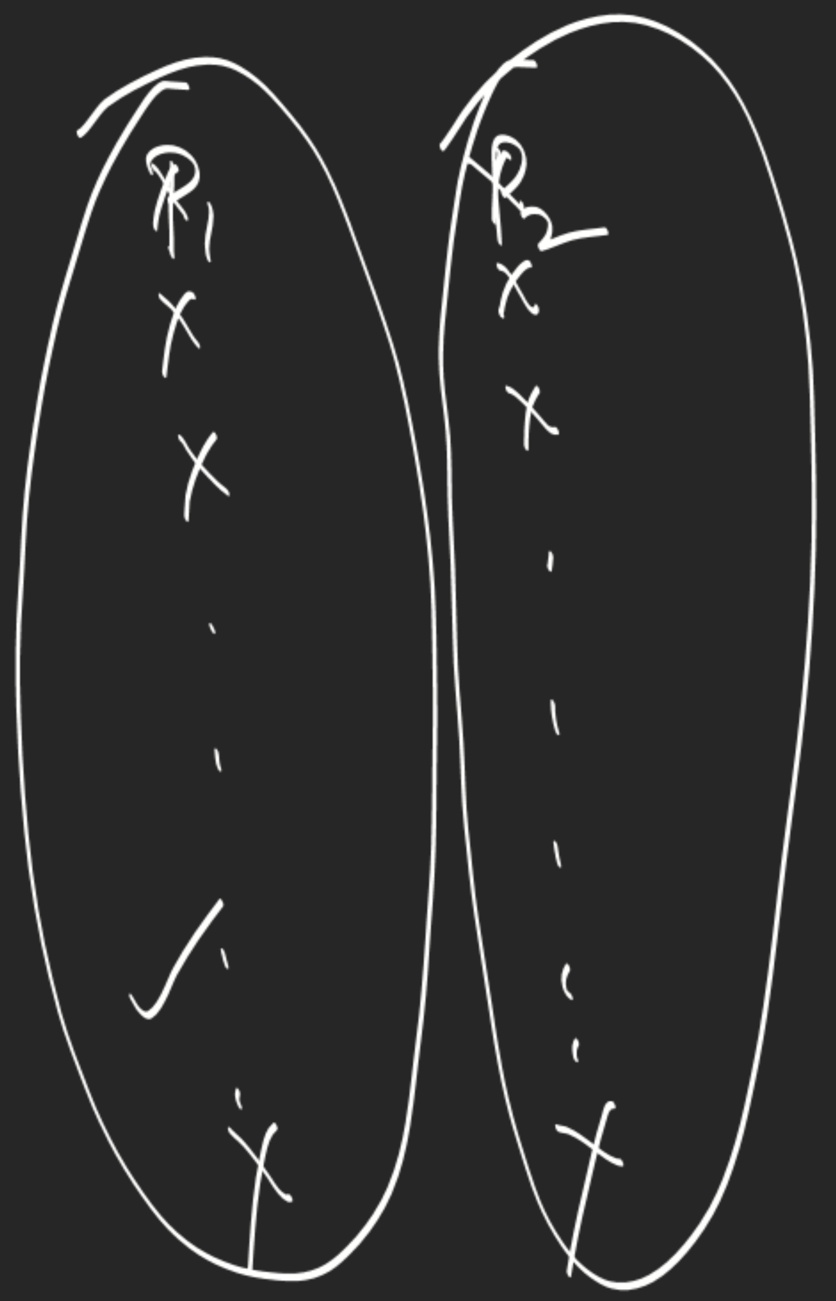
P_1

$$\frac{{}^{30}C_{15}}{{}^{31}C_{15}} = \frac{16}{31}$$



$$\frac{30}{31} \times \frac{14}{15} \times \frac{6}{7} \times \frac{2}{3}$$

P_1