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# Total Probability theorem.

Let an event $E$ can only occur with one of the 'n' mutually exclusive and exhaustive events $A_1, A_2, A_3, \ldots, A_n$, then

$$\boxed{P(E) = \sum_{i=1}^{n} P(A_i)\, P(E/A_i)}$$

Baye's theorem

$$P(A_3/E) = \frac{P(A_3 \cap E)}{P(E)} = \frac{P(A_3)\,P(E/A_3)}{\sum_{i=1}^{n} P(A_i)\,P(E/A_i)}$$

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$$P(E) = P(E \cap A_1) + P(E \cap A_2) + P(E \cap A_3) + \dots + P(E \cap A_n)$$

$$\boxed{P(E) = P(A_1)P(E/A_1) + P(A_2)P(E/A_2) + P(A_3)P(E/A_3) + \dots + P(A_n)P(E/A_n)}$$

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# Baye's theorem

$$P(A_k/E) = \frac{P(A_k)\,P(E/A_k)}{\sum_{i=1}^{n} P(A_i)\,P(E/A_i)}$$

$k = 1, 2, \ldots, n$

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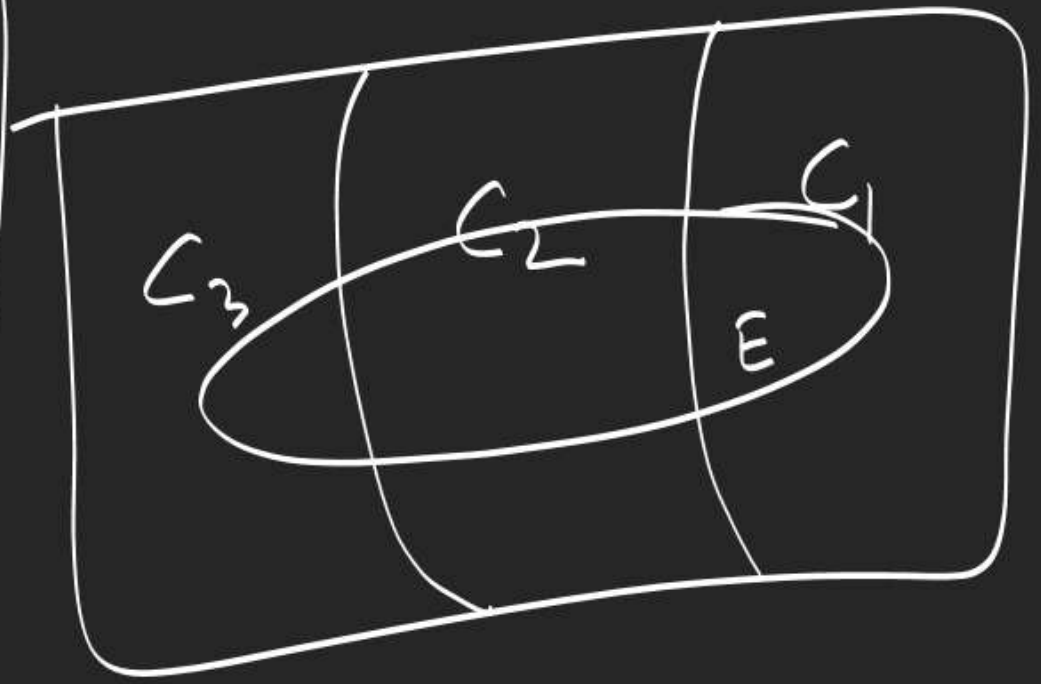
$C_i \rightarrow$ comp $i$ selected.

$E \rightarrow$ drawn coin is 10 Re.

$$P(E) = \frac{1}{3} \times \left( \underbrace{\frac{1}{3}}_{P(E/C_1)} + \underbrace{\frac{2}{5}}_{E/C_2} + \underbrace{\frac{3}{7}}_{E/C_3} \right)$$




$$P(C_1) = P(C_2) = P(C_3) = \frac{1}{3}$$

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2.

$$(0.4)\left(\frac{{}^{11}C_1 \times 1}{{}^{20}C_2}\right) + (0.6)\left(\frac{{}^{11}C_2 \times 1}{{}^{20}C_3}\right)$$

$$\boxed{\_\ \_\ \cdots\ \_\ \_\ \_}\ \ \underline{\underline{D}}$$

$$0.4\left(\frac{{}^{2}C_1\,{}^{18}C_{10}}{{}^{20}C_{11}} \times \frac{1}{9}\right) + 0.6\left(\frac{{}^{3}C_2\,{}^{17}C_{9}}{{}^{20}C_{11}} \times \frac{1}{9}\right)$$

$$0.4\left(\frac{2}{20} \times \frac{18}{19} \times \frac{17}{18} \times \cdots \frac{9}{10} \times \frac{1}{9} \times {}^{11}C_1\right) + 0.6\left(\frac{3}{20} \times \frac{2}{19} \times \frac{17}{18} \times \frac{16}{17} \times \cdots \frac{9}{10} \times \frac{1}{9} \times {}^{11}C_2\right)$$

DNN . . . ND

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DDNNN . . ND

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# Binomial Probability