(Q) A box contains 6 red balls & 4 green balls & a second box contains 7 red balls & 3 green balls. A ball is randomly chosen from first box and placed in second. Then a ball is randomly selected from second box & placed in first.

(a) Find prob that a red ball is selected from first & a red is selected from second too

A = red ball from box 1
B = red ball from box 2

$$P(A) = \frac{n(E)}{n(S)} = \frac{{}^6C_1}{{}^{10}C_1} = 0.6$$

Now 2nd box contains → 8 Red, 3 Green

$$\therefore P(B/A) = \frac{n(E)}{n(S)} = \frac{{}^8C_1}{{}^{11}C_1} = \frac{8}{11} = 0.73$$

Method 1 - intuition

∴ since events are happening in steps, hence multiply

$\Rightarrow (0.6)(0.73)$

$= \boxed{0.43} \rightarrow$ ans

Method 2 - formula

we need to find prob that a red ball is selected from box 1 & a red ball is selected from box 2

$\Rightarrow P(A \cap B) = P(B|A) \cdot P(A)$

$= (0.73)(0.6)$

$= \boxed{0.43} \rightarrow$ ans

(b) At the conclusion of selection process, what is the prob that the no. of red & green balls are identical to no. at the begining

METHOD 1 - intuition

→ This is possible, if either (a) a red ball is selected from first box and a red ball is selected from the second box (b) or, a green ball is selected from first box and a green ball is selected from 2nd box

$\boxed{\text{Since cases} \Rightarrow \text{probabilities add}}$

$\therefore P(E) = 0.43 + \left(\frac{4}{10}\right)\left(\frac{4}{11}\right) = \boxed{0.58}$

part A

same as part A (case green)

METHOD 2 - formula

ignore cause this method is tough

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(Q) One box contains six red balls and four green balls, and a second box contains seven red balls and three green balls. A ball is randomly choosen from first box and placed in second box. Then a box is randomly selected from from the second ~~box~~ and placed in first.

(a) What is the probability that a red ball is selected from the first box and a red ball is selected from the second box?

$\therefore P(\text{red ball from 1st box}) = \frac{n(E)}{n(S)} = \frac{^6C_1}{^{10}C_1} = \boxed{0.6}$

Now 2nd box contains → 8 Red, 3 Green

$\therefore P(\text{red ball from 2nd box}) = \frac{n(E)}{n(S)} = \frac{^8C_1}{^{11}C_1} = \frac{8}{11} = \boxed{0.73}$

A = red ball from 1
B = red ball from 2.

now 0.73 will be probability of selecting a red ball from 2nd box, given that a red ball is transferred from $1 \to 2 \Rightarrow P(B/A) = 0.73$

∴ we need to find probability that a red ball is selected from 1st box and a red ball is selected from 2nd box

or instead of using pr since steps ⇒ probabilities multiplies

$= P(A \cap B)$

$= P(B/A) \times P(A)$

$= \boxed{(0.73)(0.6)} = (0.43)$

(b) At the conclusion of selection process, what is the probability that the numbers of red and green balls in 1st box are identical to no. at beginning.

→ This is possible, if either ① a red ball is selected from first box and a red ball is selected from the second box ② or, a green ball is selected from first box and a green ball is selected from 2nd box

$\boxed{\text{2 cases} \Rightarrow \text{probabilities add}}$

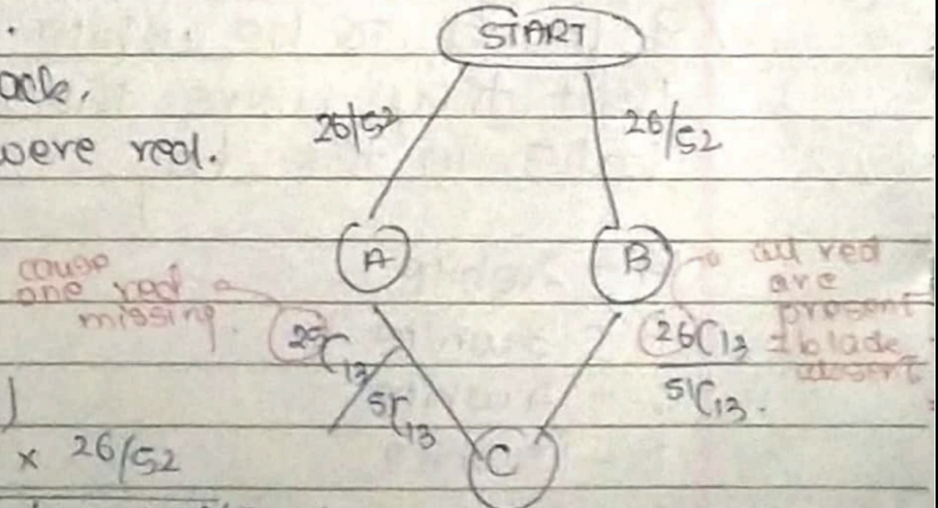
$\therefore P(E) = 0.43 + \left(\frac{4}{10}\right)\left(\frac{4}{11}\right) = \boxed{0.58}$

part A

same as part A just green...

(10) A pack of playing cards was found to have only 51 cards. If first 13 cards were all found to be red, Find prob that missing card was black.

A :- missing red.
B :- missing black.
C :- 13 cards were red.



$\therefore P(\text{black missing})$

$$= \frac{{}^{26}C_{13}/{}^{51}C_{13} \times 26/52}{\left(\frac{26}{52}\right)\left(\frac{{}^{25}C_{13}}{{}^{51}C_{13}}\right) + \left(\frac{26}{52}\right)\left(\frac{{}^{26}C_{13}}{{}^{51}C_{13}}\right)}$$

= ans

(Q) Bag has 5 green & 7 red balls. 2 balls are drawn in succession

(a) If no replacement.

(i) If Ist ball was green then prob that 2nd is red ball

not always.

now since if .... then. ⇒ conditional prob.

$A \rightarrow$ geting green ball

$B \rightarrow$ geting red ball.

now acc to ques prob of red when a green goes $= P(B/A) = 7/11$ — cause removal of green makes effect.

red balls

(ii) find prob that Ist is green and 2nd is red ball.

and ⇒ $\cap$ ∴ ans → $P(A \cap B)$

$= P(A) \times P(B/A)$

$= \left(\frac{5}{12}\right) \times \left(\frac{7}{11}\right)$ → ans.

(iii) Find prob that IInd is green.

$n(S) = 12$.

$n(E) =$ (Ist red)(2nd green) + (Ist green)(2nd green)

$= \left(\frac{7}{12}\right) \times \left(\frac{5}{11}\right) + \left(\frac{5}{12}\right) \times \left(\frac{4}{11}\right)$

cause one red ball goes.

cause stage.

cause case

cause one green goes

cause one green goes.

(iv) Find prob Ist gree, 2nd green, 3rd red.

$\left(\frac{5}{12}\right) \times \left(\frac{4}{11}\right) \times \left(\frac{7}{10}\right)$.

cause stage.

(b) with ~~no~~ $\boxed{\text{replacement}}$

means replace & place back.

(i) now removal of green ball makes no effect on red cause we hv again put is back.

∴ case of independent event

$= \left(\frac{7}{12}\right)\cancel{\left(\frac{5}{12}\right)}$ → ans.

→ in conditional probability just take care of replacement & non replacement.

(ii) $\left(\frac{5}{12}\right)\left(\frac{7}{12}\right)$

(iii) now since removal of 1st ball makes no different ⇒ prob of removal of 2nd green

= prob of green ball

= $5/12$ ans

(iv) $\left(\frac{5}{12}\right)\left(\frac{5}{12}\right)\left(\frac{7}{12}\right)$

(Q) A bag has 3 red, 4 green and 5 blue balls. 3 balls are drawn in succession with no replacement. Find probability that they are "red, blue, green"

(I) In same order.

(m1) $\left(\frac{3}{12}\right) \times \left(\frac{5}{11}\right) \times \left(\frac{4}{10}\right) = \frac{1}{22}$ — ans

cause steges

(m2) $\frac{{}^3C_1 \times {}^4C_1 \times {}^5C_1}{{}^{12}C_1 \times {}^{11}C_1 \times {}^{10}C_1}$

(II) any order.

$\boxed{\text{CASE I}}$ → R, B, G. ⇒ $P(E_1) = 1/22$.

$\boxed{\text{CASE 2}}$ → R, G, B ⇒ $P(E_2) = (3/12)\left(\frac{4}{11}\right)(5/10) = 1/22$

$\boxed{\text{CASE 3}}$ → B, G, R. ⇒ $P(E_3) = 1/22$

$\boxed{\text{CASE 4}}$ → B, R, G ⇒ " "

$\boxed{\text{CASE 5}}$ → G, B, R. ⇒ " "

$\boxed{\text{CASE 6}}$ → G, R, B. ⇒ " "

cause cases.

$\therefore P(E) = P(E_1) + \ldots\ldots + P(E_6)$

$= \frac{6}{22}$ — ans.