Permutation and Combination Continued

BYJU'S EXAM PREP

The Most Comprehensive
Preparation App For All Exams

3!

$$5_{C_3} \times 3! = 5_{P_3}$$

$$= 5 \times 4 \times 3$$

$$= 60$$

ways.

Find the number of 3 letter words containing vowels only formed by using letters of ~~TRIANGLE~~. EQUATION

A. 3
B. 6
C. 8
D. 12
E. None of these

KOLAT

K   A

$$\frac{7!}{2! \, 2!}$$

$$= \frac{5040}{4}$$

$$= 1260$$

Find the number of words formed by using all letters of the word KOLKATA.

A. 860

B. 960

C. 1260

D. 5040

E. None of these

V C V C V C

C V C V C V

BTY
―――
E A LL

$2 \times 3! \times 3!$

$= 72$
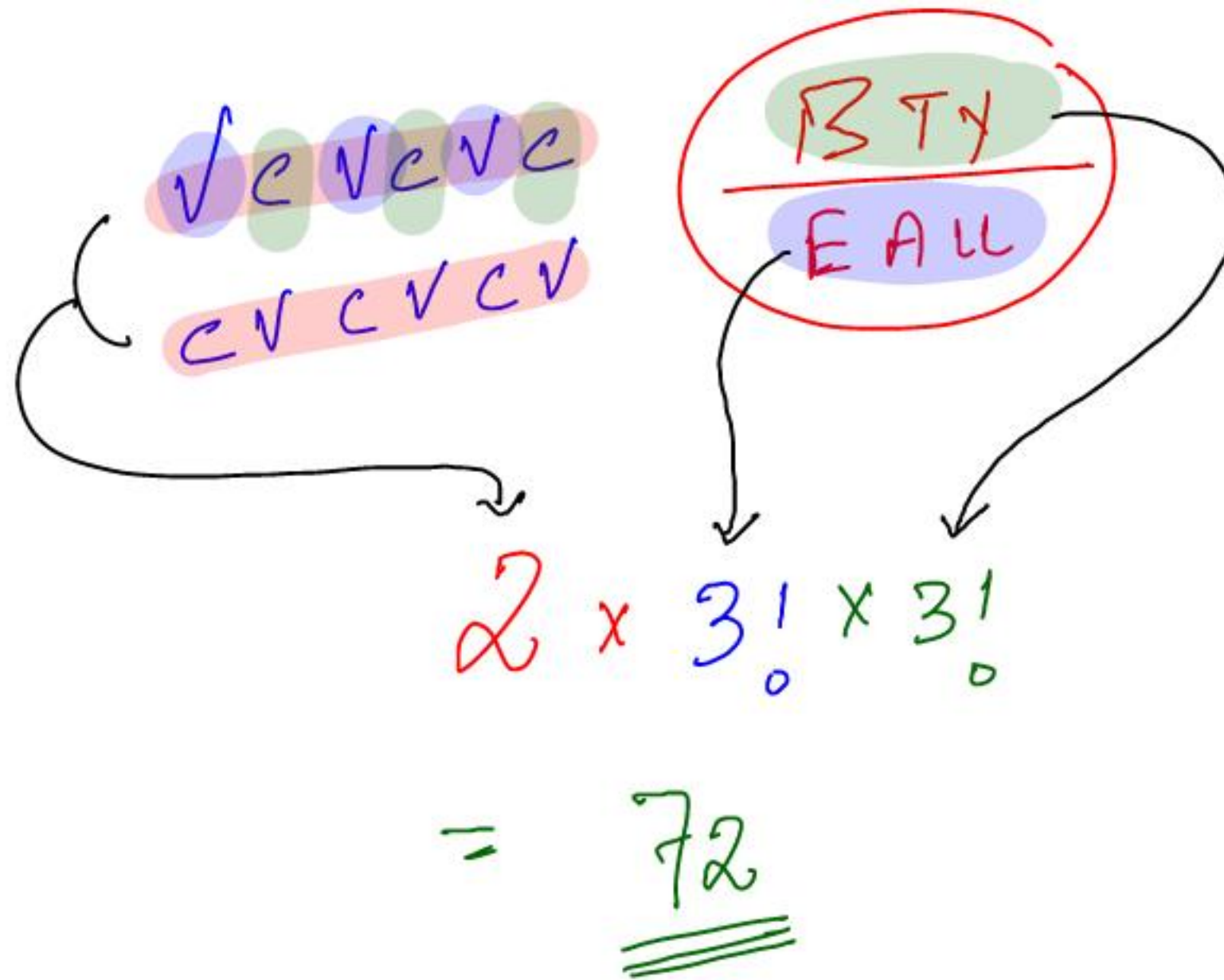
In how many ways the letters of the word BEAUTY be arranged so that the vowel and consonants occupy alternate positions?

A. 72

B. 64

C. 60

D. 48

E. 24

$$M \underset{N}{\overset{N}{}} T \quad \left(\text{O U A I}\right)$$

$$\frac{5!}{2!} \times 4!$$

$$= \frac{120 \times 24}{2}$$

$$= 1440$$

In how many ways can the letters of word 'MOUNTAIN' be arranged such that all the vowels come together?

A. 1120

B. 1240
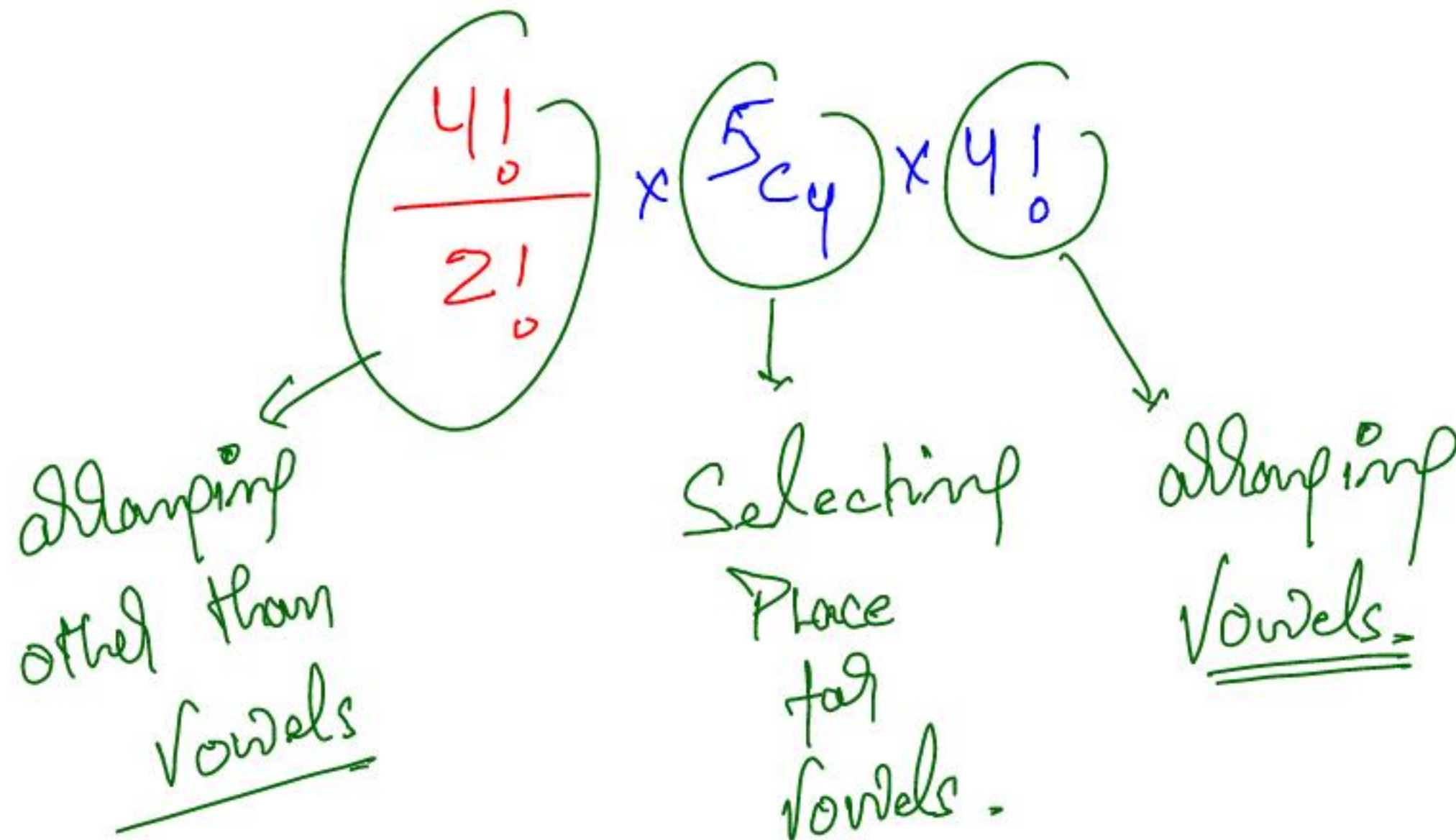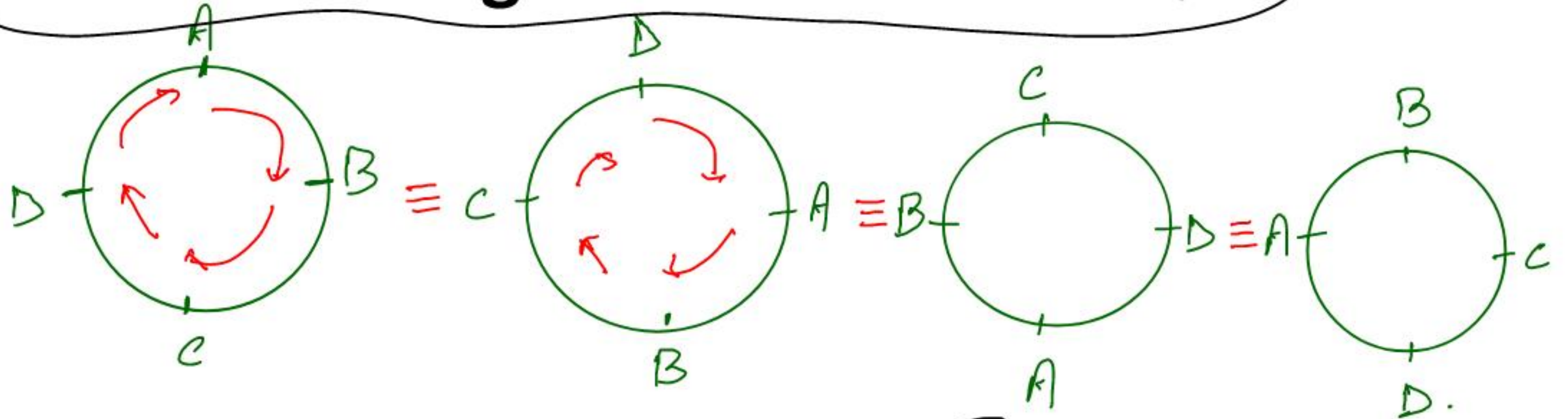
C. 1420

D. 1440

E. None of these

Tie

Concept

In how many ways can the letters of word 'MOUNTAIN' be arranged such that no two vowels come together?

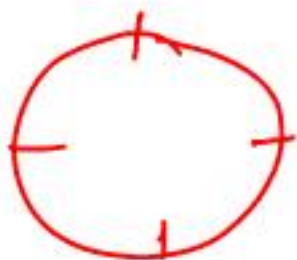$$\_ \ M \ \_ \ N \ \_ \ N \ \_ \ T \ \_$$

$$\left(\frac{4!}{2!}\right) \times \left(^{5}C_4\right) \times \left(4!\right)$$

arranging other than Vowels

Selecting Place for Vowels.

arranging Vowels.

Circular Arrangement $= 1 \times (n-1)!$

$A \longrightarrow$ 4 ways

$A \longrightarrow$ 1 way

* Garland/Necklace

$$\frac{(n-1)!}{2}$$

In how many ways can we arrange 10 students around a circular table such that distance between any two adjacent students is same.
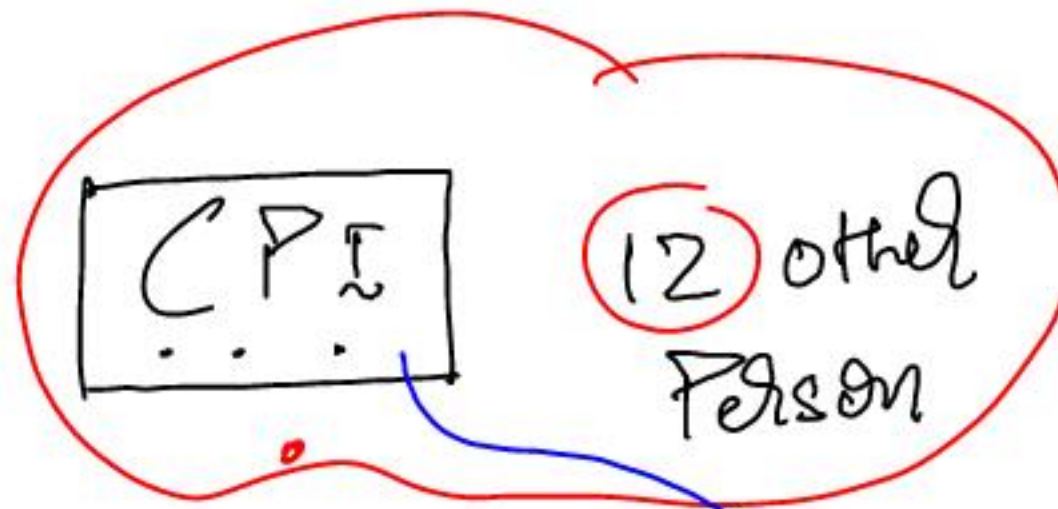
$$9!_0$$

In how many ways can we arrange 9 different flowers in a circle to form a garland using these flowers?

A. 20160

B. 10080

C. 10020

D. 9660

E. None of these

$$\frac{8!}{2}$$

Ans. A

$\boxed{C P I}$ (12) other Person

13

$\downarrow$

$\left(12!_0 \right) \times 3!_0$

$=$

There is meeting of 15 foreign delegates from 15 different countries to be held in a resort. In how many ways these foreign delegates can be seated along a round table, if delegates from China, Pakistan and Iran always seat together.

A. 12! × 3!

B. 12! × 2!

C. 13! × 3!
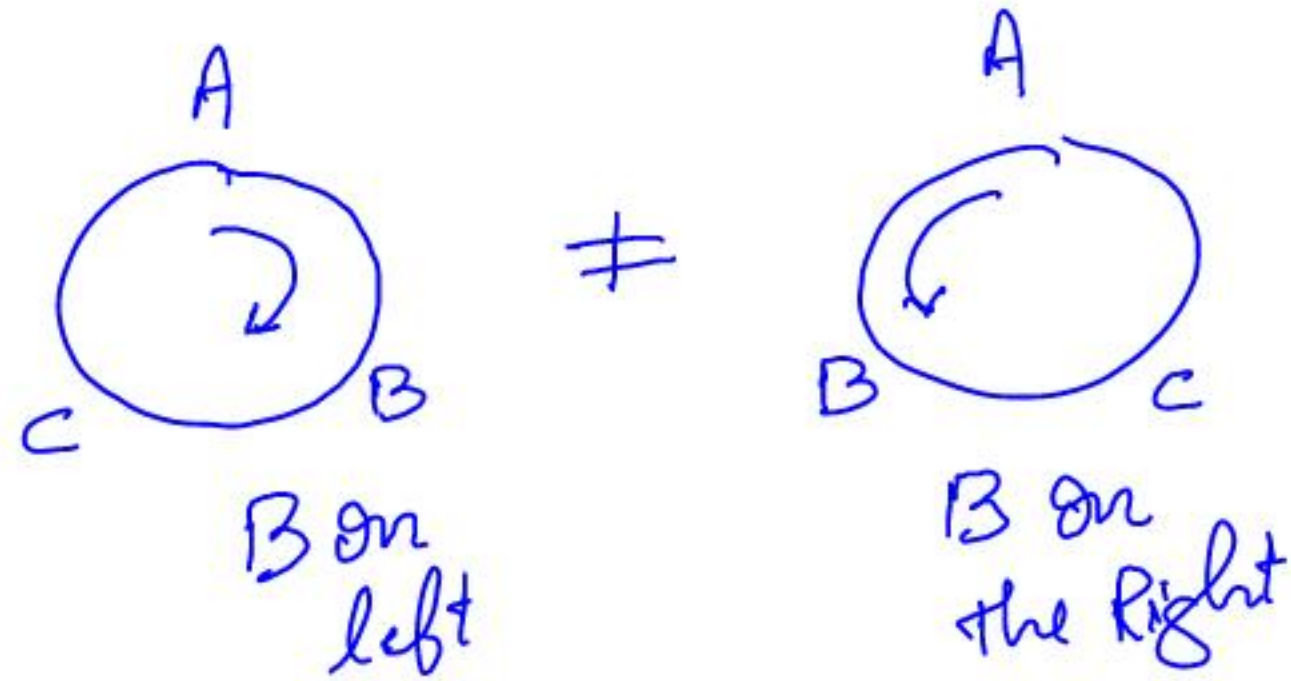
D. 12! × 4!

E. None of these

Ans. A

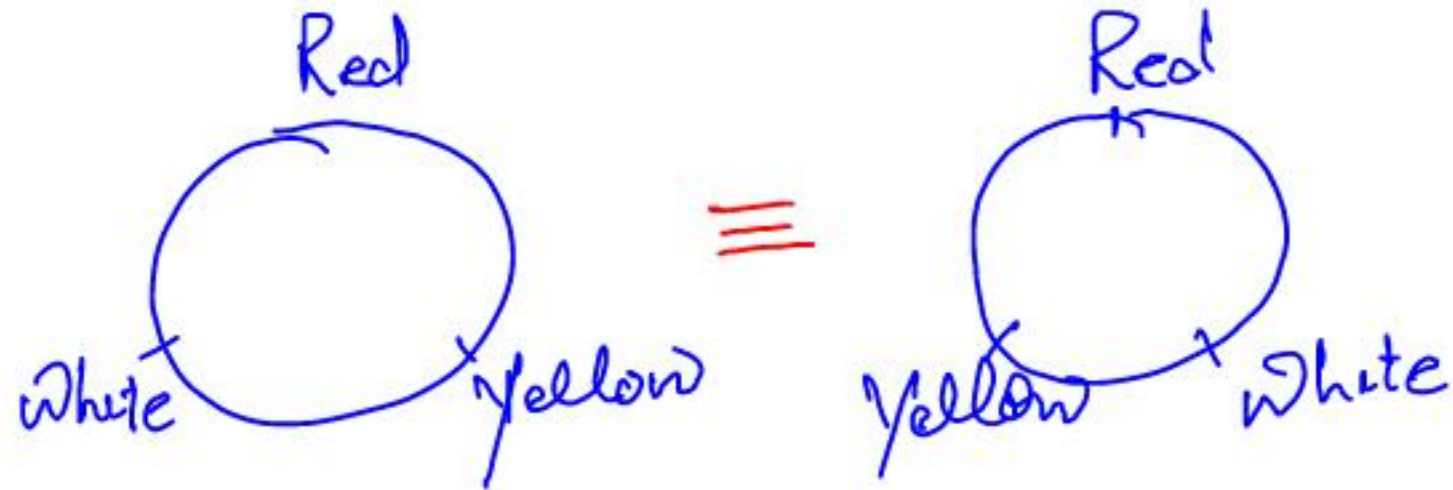$\dfrac{\text{Chair}}{\text{Table}}$

A

C   B

B on left

$\neq$

A

B   C

B on the Right
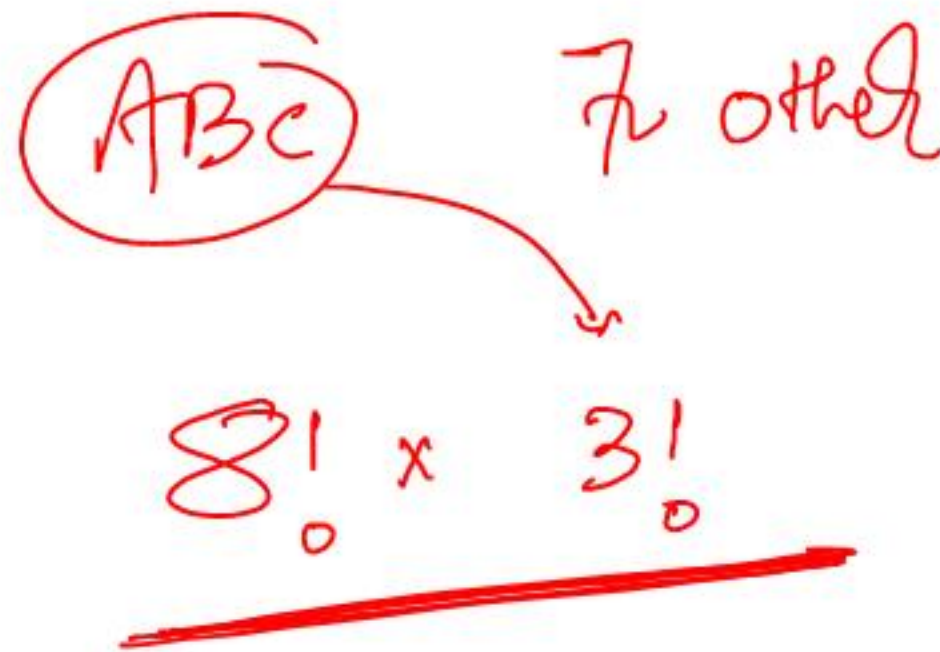
$(n-1)!$

$\dfrac{\text{Garland}}{\text{Necklace}}$

Red

White   Yellow

$\equiv$

Red

Yellow   White

$\dfrac{(n-1)!}{2}$

(ABC) 7 other

$8! \times 3!$

There are 10 persons (A, B, C, D, E, F, G, H, I, J) which are to be seated in a row. Find the number of ways such that A, B, C are always sitting together.

A. $9!$

B. $10c_3 \times 7!$

C. $7! \times 8c_3 \times 3!$

D. $8! \times 3!$

E. None of these

Random Experiment

4R 3G $\longrightarrow$ 1 Ball $\longrightarrow$ $P(R) = \dfrac{4}{7}$

1,2,3,... 9 $\longrightarrow$ 1 No. $\longrightarrow$ $P(even) = \dfrac{4}{9}$

Probability

Chances of
Happening an event

Probability

$$P = \frac{\text{No. of fav Ways}}{\text{Total No. of ways}}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$\boxed{0 \leq P \leq 1}$$

$$\boxed{\bar{P} = 1 - P}$$

$S = $ Sample Space

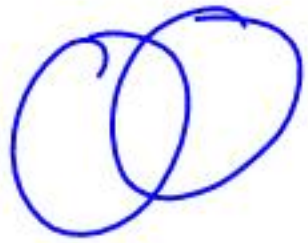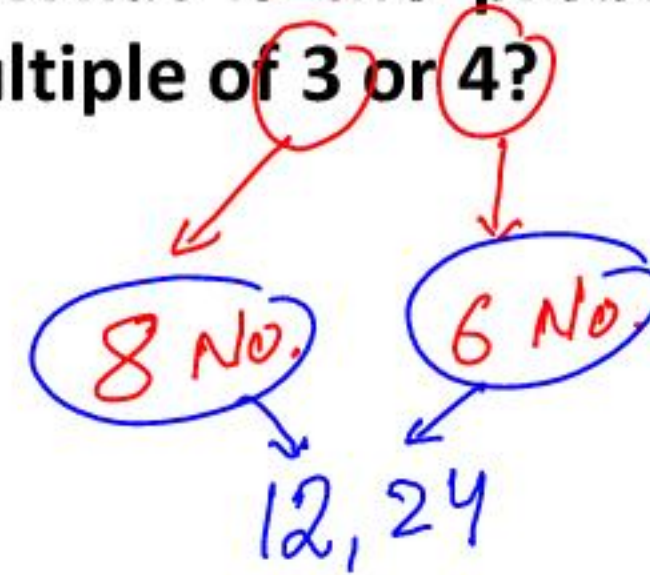$\hookrightarrow$ List of all outcomes.

Probability

Probability

In a bag there are tickets numbered 1 to 25 and a ticket is drawn at random. What is the probability of getting a number which is multiple of 3 or 4?

A. 7/12

B. 3/5

C. 9/25

D. 12/25

E. None of these

8 No.

6 No.

12, 24

$$\frac{8 + 6 - 2}{25}$$

$$= \frac{12}{25}$$

Box-without replacement

$$8R \quad 4G \longrightarrow \text{2 Ball drawn at Random}$$

One by One
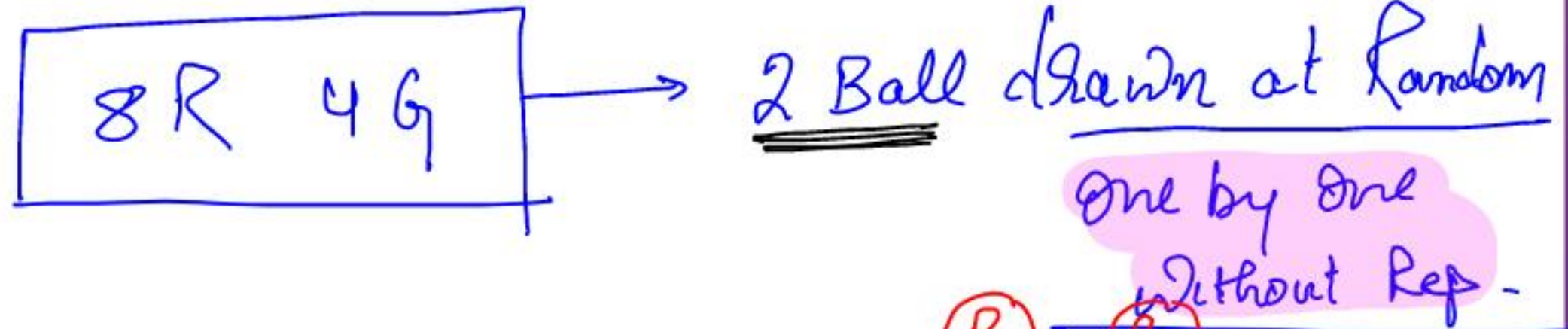
Without Rep-

(1) Red Both

$$\frac{8C_2}{12C_2} = \frac{\frac{8 \times 7}{2}}{\frac{12 \times 11}{2}} = \frac{8 \times 7}{12 \times 11} = \frac{8}{12} \times \frac{7}{11}$$

(R) (R)

(2) Both Green

$$\frac{4C_2}{12C_2} = \frac{4}{12} \times \frac{3}{11}$$

(3) Different Color Balls.

R   G

$$\frac{8}{12} \times \frac{4}{11} \times 2!$$

$$\frac{8C_1 \times 4C_1}{12C_2}$$

Box-without replacement

A bag contains 8 Red, 6 Green and 4 Black balls. 3 balls are drawn at random *(or one by one without replacement)*. What is the probability of

$$\frac{8_{C_1} \times 6_{C_1} \times 4_{C_1}}{18_{C_3}}$$ ⟵ 1. All balls of different color

$$\frac{8_{C_3}}{18_{C_3}}$$ ⟵ 2. All Red

Total − No Red ⟵ 3. Alteast one Red

$$1 - \frac{10_{C_3}}{18_{C_3}}$$

Box-without replacement

Box-with replacement

A bag contains 8 Red, 6 Green and 4 Black balls. 3 balls are drawn at *one by one with replacement*. What is the probability of

$$\left(\frac{8}{18} \times \frac{6}{18} \times \frac{4}{18}\right) \times 3!$$

← 1. All balls of different color

$$\left(\frac{8}{18} \times \frac{8}{18} \times \frac{8}{18}\right)$$

← 2. All Red

R R G

$$\left(\frac{8}{18} \times \frac{8}{18} \times \frac{6}{18}\right) \times \frac{3!}{2!}$$

← 3. Two red and one green

$$1 \times \left(\frac{12}{28}\right)^3 + \left(\frac{16}{28}\right)^3 \times 1$$

$$= \frac{27 + 64}{343}$$

$$= \frac{91}{343}$$

$$= \boxed{\frac{13}{49}}$$

A bag contains 12 pink and 16 brown balls. If three balls are chosen one by one with replacement, what is the probability that all are of same colour?

A bag contains 10 pink and 16 brown balls. If two balls are chosen one by one with replacement, what is the probability that all are of different colour?

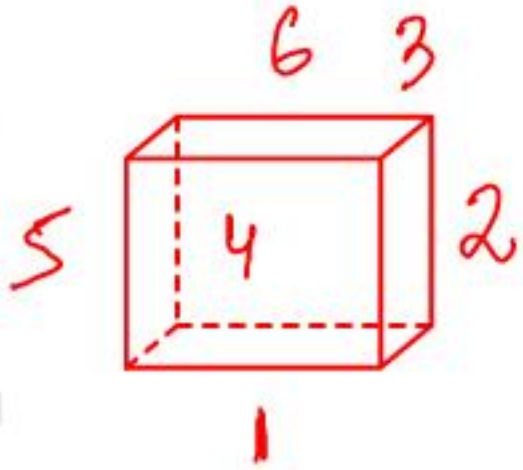$$\begin{array}{cc} P & B \\ \dfrac{10}{26} & \times \dfrac{16}{26} \times 2! \end{array}$$

A box contains **4 blue pens**, and **5 green pens** and **6 red** pens. **Two pens** are drawn **at random** from the box. What is the probability that **both pen drawn** are **either red** or **green?**

A. 5/21

B. 1/3

C. 2/15

D. 13/15

E. None of these

$$\frac{6c_2 + 5c_2}{15c_2}$$

Dice $\longrightarrow$

1 Dice $\longrightarrow$ $\{1, 2, 3, 4, 5, 6\}$

2 Dice $\longrightarrow$ 6^2

1 $<$ 1, 2, 3, 4, 5, 6.

2 $<$

3 $<$

3 Dice $\rightarrow$ 6^3.

Dice

$\{1, 2, 3, 4, 5, 6\}$
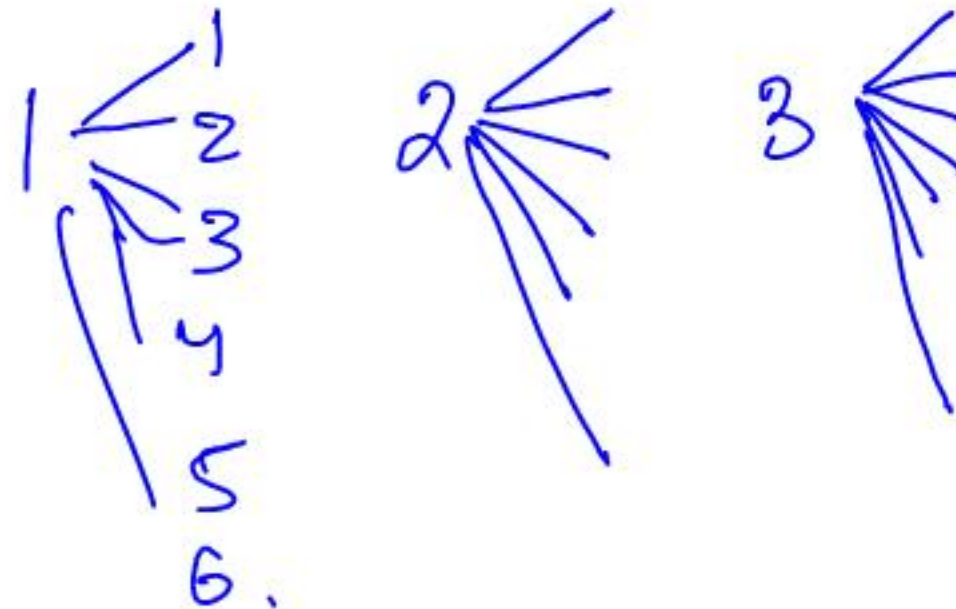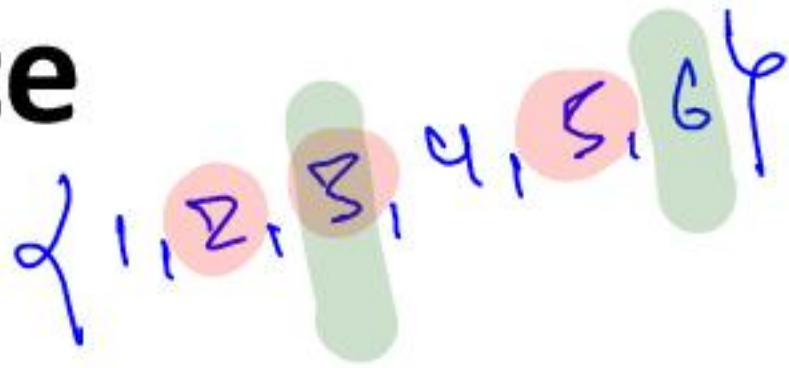
A dice has been rolled. What is the probability of getting

1. Even Number $\dfrac{3}{6}$

2. Odd Number $\dfrac{3}{6}$

3. Prime Number $\dfrac{3}{6}$

4. Multiple of 3 $\dfrac{2}{6}$

Dice

Two dice has been rolled. What is the probability of

1. Sum atleast 10

$$\frac{1}{6} = \frac{6}{6^2}$$

$10 \longrightarrow (4,6)\ (5,5)\ (6,4)$

$11 \longrightarrow (5,6)\ (6,5)$

$12 \longrightarrow (6,6)$

2. Sum atmost 5

$$\boxed{\frac{5}{18}} = \frac{10}{6^2}$$

$5 \quad (1,4)\ (4,1)\ (2,3)\ (3,2)$

$4 \quad (1,3)\ (3,1)\ (2,2)$

$3 \quad (1,2)\ (2,1)$

$2 \quad (1,1)$
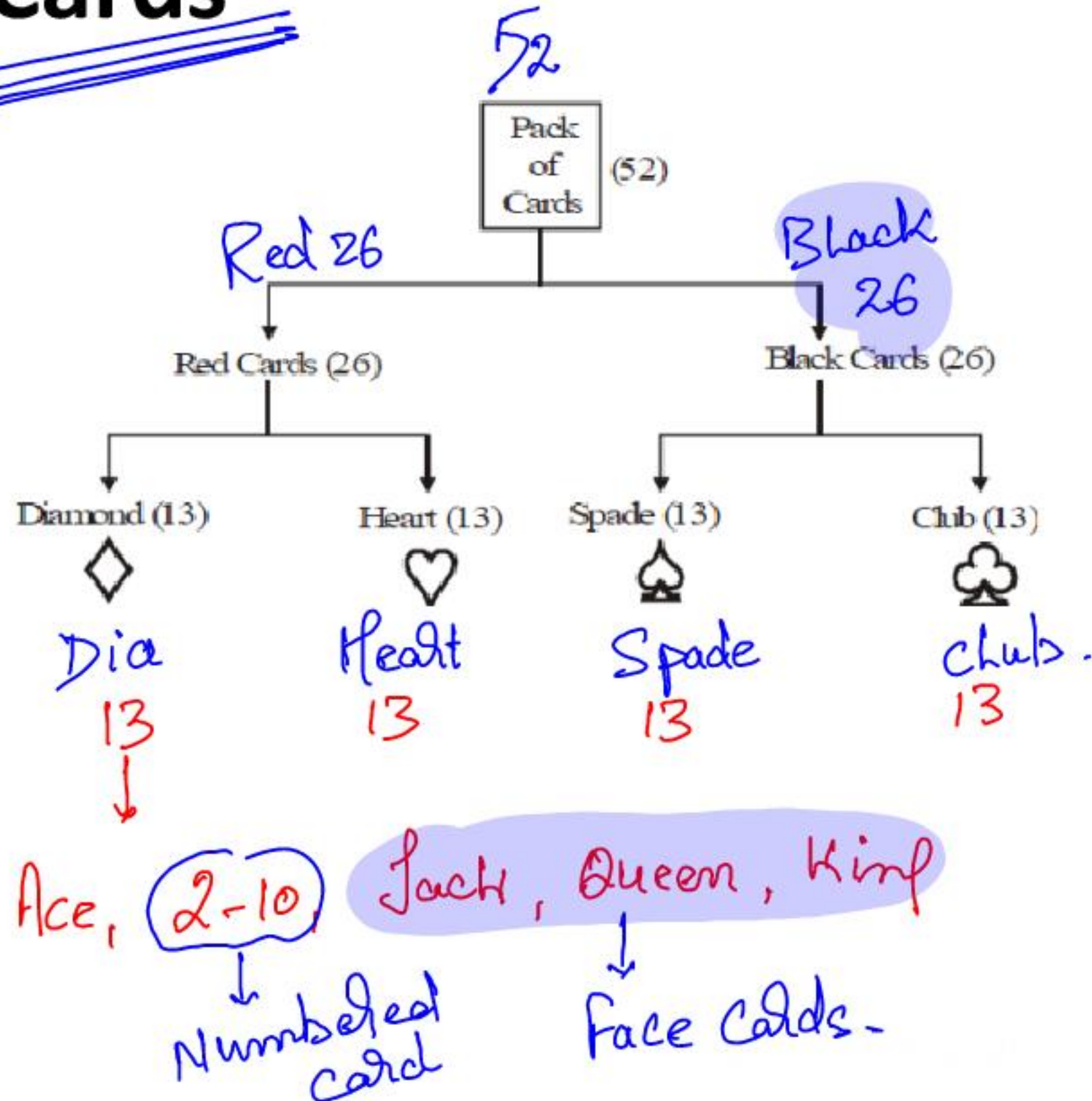
Dice

Two dice has been rolled. What is the probability of

1. Getting even sum

2. Getting even product

Cards

52

```
        Pack
        of     (52)
        Cards
```

Red 26   Black
                                            26

Red Cards (26)   Black Cards (26)

Diamond (13)   Heart (13)   Spade (13)   Club (13)

◇   ♡   ♠   ♣

Dia   Heart   Spade   club.
13   13   13   13

Ace, (2-10), Jack, Queen, King

Numbered card   Face Cards-

Cards

Two cards are drawn from well shuffled pack of cards. What is the probability of
1. Both Black cards

$= Spade\ (13)$

$\underline{club}$

$\underline{Heart}$

$\underline{Dia}$

$$\frac{26c_2}{52c_2} = \frac{26}{52} \times \frac{25}{51} = \frac{25}{102}$$

2. Both same suit

$$\frac{4c_1 \times 13c_2}{52c_2} = \left(\frac{13}{52} \times \frac{12}{51}\right) \times 4$$

Cards

1 Suit → 3 face

Two cards are drawn at random from well shuffled pack of cards. What is the probability of
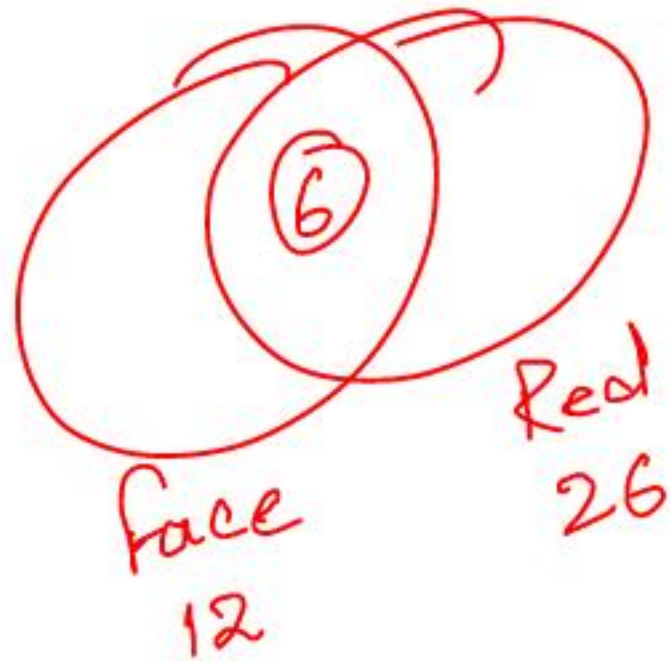
1. Different color

$$\frac{26}{52} \times \frac{26}{51} \times 2!$$
$$\underset{(B)}{} \quad \underset{(R)}{}$$

$$\frac{^{26}C_1 \times ^{26}C_1}{^{52}C_2}$$

$B \quad R$

2. Both face cards

$$\frac{^{12}C_2}{^{52}C_2}$$

Cards

face
12

Red
26

Two cards are drawn at random from well shuffled pack of cards. What is the probability of

1. Both either face or red card

$$\frac{12_{C_2} + 26_{C_2} - 6_{C_2}}{52_{C_2}}$$

From a pack of 52 cards, three cards are drawn at random. What is the probability that two are diamonds and one is spade?

A. 52/849

B. 41/850

C. 14/455

D. 39/850

E. None of these

Coins $\longrightarrow$

2^n

1 Coin $\longrightarrow$ H, T   2 outcomes -

2 Coin $\longrightarrow$ HT   4
TH
HH
TT

3 Coins $\longrightarrow$ HHH   8
HHT / HTH / THH
HTT / THT / TTH
TTT

Coins

5 coins $P(2H) = ?$

$$\underset{H}{-}\ \underset{H}{-}\ \underset{T}{-}\ \underset{T}{-}\ \underset{T}{-}$$

$$\frac{5!}{2!\,3!} = \boxed{5C_2}$$

$$\frac{5C_2}{2^5} = \frac{10}{32} = \frac{5}{16}$$

Two unbiased coins are tossed. What is the probability of getting no head?

A. 1/3
B. 3/4
C. 1/2
D. 1/4
E. None of these

T T

$$\frac{1}{4}$$

$$HHH = \frac{1}{8}$$

In a simultaneous throw of three coins, what is the probability of getting at least one tail?

A. 7/8

B. 5/8

C. 3/8

D. 1/4

E. None of these

at least one Tail $= 1 -$ No Tail

$$= 1 - \frac{1}{8}$$

$$= \frac{7}{8}$$

In a simultaneous throw of three coins, what is the probability of getting at least two tail?

$$\frac{4}{8}$$

$$= \frac{1}{2}$$

TTH $\longrightarrow$ 3

+

TTT $\longrightarrow$ 1
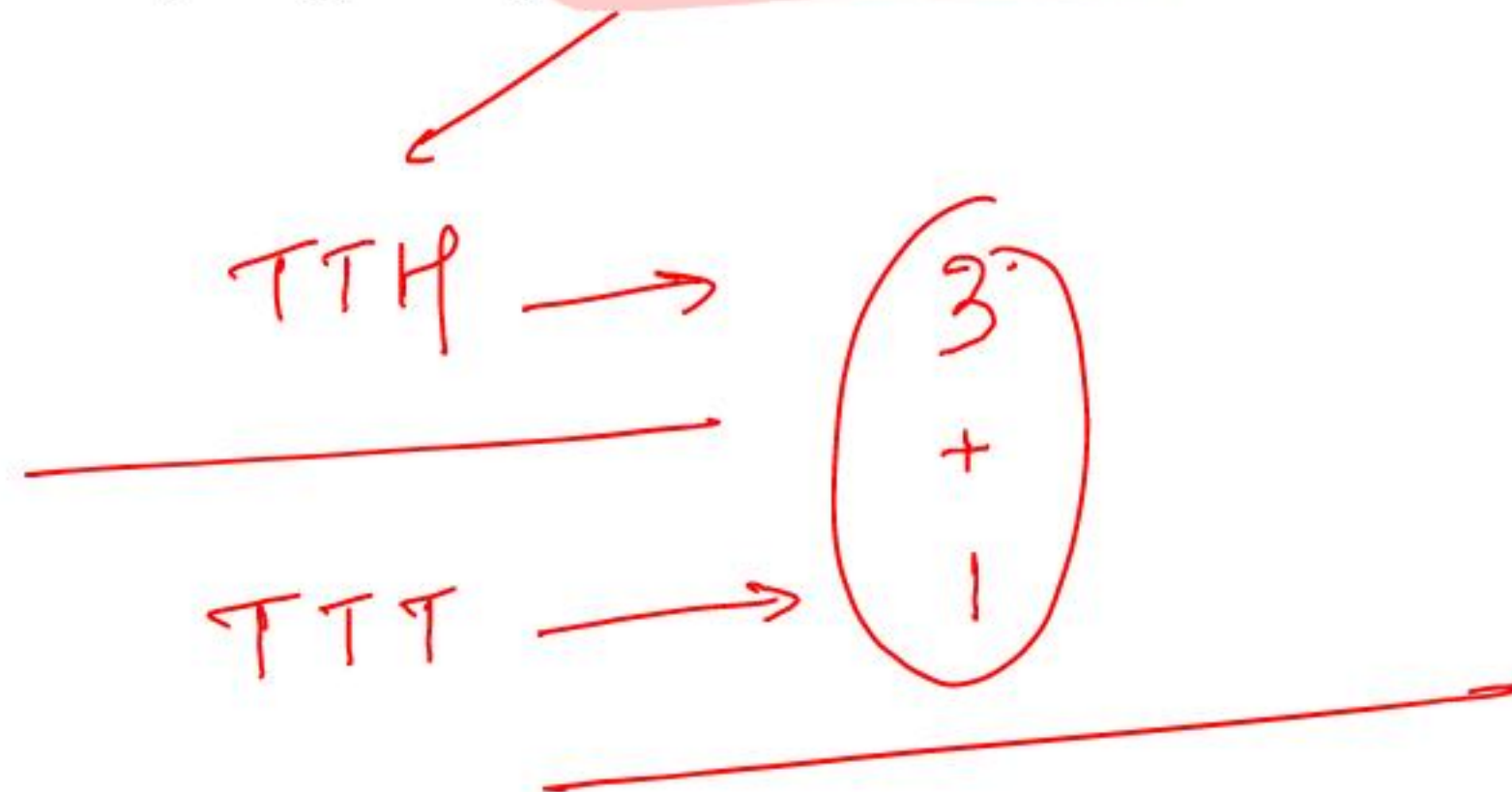
In a simultaneous throw of 5 coins, what is the probability of getting a greater number of tails than heads?

Ans ½

A. 7/8

B. 5/8

C. 3/8

D. 1/4

E. None of these

J D

✓ X → $\frac{1}{4} \times \left(1 - \frac{1}{6}\right)$

(+) +

X ✓ → $\left(1 - \frac{1}{4}\right) \times \frac{1}{6}$

$= \frac{1}{4} \times \frac{5}{6} + \frac{3}{4} \times \frac{1}{6}$

$= \frac{8}{24}$

$= \frac{1}{3}$

Jeetan and Damani go for an interview for two vacancies. The probability for the selection of Jeetan is 1/4 and whereas the probability for the selection of Damani is 1/6 . What is the probability that only one of them is selected?

A. 5/8

B. 3/8

C. 4/7

D. 2/7

E. 1/3

A, B and C attempted a problem. Probability that A, B and C correctly solve the problem are 1/3, 2/5 and ¾ respectively. Find the probability that

1. At least one of them correctly solved

$$1 - None$$

$$= 1 - No\ Correct$$

$$= 1 - \frac{2}{3} \times \frac{3}{5} \times \frac{1}{4} \qquad = \frac{9}{10}$$

A, B and C attempted a problem. Probability that A, B and C correctly solve the problem are 1/3, 2/5 and ¾ respectively. Find the probability that

1. At most two of them correctly solved

H/w.

Similar

Jeetam & Darmini
Wala
Q.

A, B and C attempted a problem. Probability that A, B and C correctly solve the problem are 1/3, 2/5 and ¾ respectively. Find the probability that

1. Exactly one of them answered correct

Hw-

A bag contains seven blue, 'x' red and 'y' yellow balls. If one ball taken out random from bag probability of being red is 1/4 and that of being yellow is 2/5 . If three balls taken out random from vessel, then find probability of being all three balls are different colours?

A. 4/19   B. 14/57   C. 15/57

D. 11/57   E. 13/57

Ans. B

H.w.

A bag contains (a – 2) Red balls, (a – 3) Green balls, and (a + 1) Yellow balls. If the probability of drawing two Red balls from the bag is 3/38 , then find the total number of balls in the bag.

A. 22　　　　　B. 18　　　　　C. 16

D. 20　　　　　E. 24

use options –

Hw. Ⓓ

A bag contains balls numbered from 1 to 50. If three balls are drawn randomly from the bag without replacement, then what is the probability that all the drawn balls have numbers that are multiple of 7?

A. 2/123   B. 3/560   C. 2/243

D. 1/560   E. 1/420

Ans. D