[Probability Problem Exercises] (YT - Feel Free to Learn)

① Formulae:

$$\text{Probability} = \frac{\text{Sum of observation}}{\text{Total possibility}}$$

Combination formula:

"n Choose r"

$${}^{n}C_{r} \text{ or } C(n, r) = \frac{n!}{(n-r)!\, r!}$$

② And / Or.

In probability problems:

→ Whenever you find the word 'AND' → you need to multiply it.

→ Whenever you find the word 'OR' → you need to add it.

And	OR
×	+

Example:

① Suppose there are three balls (1) (2) and (3). If I have to choose 2 balls out of it, how may I do it?

Sol^n:

1 - 2
2 - 3
1 - 3

} 3 possible $= {}^{3}C_{2} = \frac{3!}{(3-2)!\, 2!} = \frac{3!}{1!\, 2!} = \frac{1 \times 2 \times 3}{1 \times 1 \times 2} = 3$

↑ 3 possible ways.

② try the same with 4 balls:

Sol^n: ${}^{4}C_{2}$

③ Assume we have 40 balls and we want to pick 2 balls. In how many ways we can do that?

Sol^n:

Total balls → 40

Target to pick → 2 balls

∴ $${}^{40}C_{2} = \frac{40 \times 39}{1 \times 2}$$

→ shortcut for calculation.

reduce 40 2 times ∴ 40×39

divide by 2 factors ∴ 1×2

Shorthand: $50C_8$ → 50 should be reduced 8 times | ∴ $\frac{50 \times 49 \ldots}{1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8}$
→ divide by 8 factorial

Exercise - 1 : Coin based

*) If one coin is tossed:
we have only 2 possible outcomes {H, T} = 2

*) If two coins are tossed:
we have 4 possible outcomes {HH, HT, TH, HH} = 4

*) If three coins are tossed: = 8
we have 8 possible outcomes:

HHH TTT
HHT TTH
HTH THT
THH HTT

*) If four coins are tossed: = 16
we have 16 possible outcomes

HHHH TTTT
HHHT TTTH
HHTH TTHT
HTHH THTT
THHH HTTT
HHTT THHT
HTTH HTHT
TTHH THTH

*) If five coins are tossed then outcomes ?

So here is the trick,
If a coin is tossed we know that it can either be heads or tails

∴ 1 coin tossed = 2^1
2 coins tossed = 2^2
3 coins tossed = 2^3
4 coins tossed = 2^4
5 coins tossed = 2^5
⋮
and so on
n coins tossed = 2^n

Q1: In a simultaneous toss of 2 coins, find the Probability of 2 tails.

Sol^n:
probability set of 2 coins = {HH HT TH TT} = 4

$$\text{Probability} = \frac{\text{Sum of observations}}{\text{Total possibility}}$$

∴ Total possibility = 4

Sum of observations = probability of 2 tails = only one probability of 2 tails

∴ Sum of observations = 1

$\therefore$ Probability $= \frac{1}{4}$

Q2 In a simultaneous toss of 2 coins, find the probability of exactly 1 tail.

Soln:

2 coin toss set = {HH, HT, TH, HH} = 4

exactly one tail condition = HT + TH = 2

Total probability = 4

$\therefore$ probability $= \frac{2}{4} = \frac{1}{2}$

Q3 In a simultaneous toss of 2 coins, find the probability of no tail.

Soln:

2 coin set = {HH, HT, TH, TT} = 4

no tails = {HH} = 1

Total probability of 2 coins toss = 4

sum of observation = 1

$\therefore$ probability $= \frac{1}{4}$

Q3 In a simultaneous toss of 3 coins, find probability of all heads.

Soln:

Defn 3 coin toss set = {HHH, HHT, HTH, THH, TTT, TTH, THT, HTT}

Total probability = 8

all heads = {HHH} = 1

$\therefore$ probability $= \frac{1}{8}$

Q4 3 coins are tossed. Find the probability of exactly 2 heads.

Soln: Total probability = 8

exactly 2 heads = Defn 3 coin toss set = {HHT, HTH, THH} = 3

$\therefore$ probability = $\frac{\text{Sum of observation}}{\text{Total probability}} = \frac{3}{8}$

Q5) 3 coins are tossed. Find the probability of atleast 2 heads

Sol^n: Total possibility = 8

atleast 2 heads = minimum 2 head = 2 heads, 3 heads are accepted

∴ atleast 2 head = {HHH, HHT, HTH, THH} = 4

∴ probability = $\frac{\text{Sum of observations}}{\text{Total possibility}} = \frac{4}{8} = \boxed{\frac{1}{2}}$ Sol^n

Q6) 3 coins are tossed. Find the probability of no heads.

Sol^n: Total possibility for 3 coins tossed = 8

no heads = {TTT} = 1

∴ probability = $\boxed{\frac{1}{8}}$ Sol^n

Q7) 3 coins are tossed. Find the probability of atleast 1H & 1T.

Sol^n: Total possibility = 8 (3 coins tossed ∴ $2^3 = 8$)

Condition: atleast 1H & 1T → HHH× TTT×
✓HHT TTH✓
✓HTH THT✓
✓THH HTT✓

∴ Sum of observations = 6

∴ $\boxed{\text{Probability} = \frac{6}{8} = \frac{3}{4}}$

Q8) 4 coins are tossed. Find the probability of exactly 3 tails.

Sol^n: Total possibility = $2^4 = 16$

4 coins tossed:
HHHH× TTTT×
HHHT× TTHT✓
HHTH× THTT✓
HTHH× HTTT✓
THHH× TTTH✓
HHTT× THHT×
HTTH× HTHT×
THTH×

condition is 3 tails exactly

∴ Sum of observations = 4

∴ $\boxed{\text{probability} = \frac{4}{16} = \frac{1}{4}}$

Q.9 4 coins are tossed. Find the probability of atleast 1 tail.

Sol^n: Total possibility = $2^4 = 16$

atleast 1 tail = { HHHT, HHTH, HTHH, THHH, HHTT, HTTH, TTHH,
i.e. 1 or more tails → TTHT, THTT, HTTH, TTTH, THHT, HTHT, THTH }

= 15

∴ probability = $\frac{15}{16}$

Exercise 2: Dice Based

Tips & Tricks:

*) If we roll 1 die, then 6 possibilities = $6^1 = 6$
{1, 2, 3, 4, 5, 6} = 6

*) If we roll 2 die, then 6^2 possibilities = $6^2 = 36$

{(1,1) (1,2) (1,3) (1,4) (1,5) (1,6)
(2,1) (2,2) (2,3) (2,4) (2,5) (2,6)
(3,1) (3,2) (3,3) (3,4) (3,5) (3,6)
(4,1) (4,2) (4,3) (4,4) (4,5) (4,6)
(5,1) (5,2) (5,3) (5,4) (5,5) (5,6)
(6,1) (6,2) (6,3) (6,4) (6,5) (6,6)}

Concept:

1 dice = $6^1 = 6$
2 dice = $6^2 = 36$
3 dice = 6^3
4 dice = 6^4
⋮
n dice rolled = 6^n

Q1: In a single throw of 2 dice, find the probability of getting a total of 3 or 5.

Sol^n:

Probability = $\frac{\text{Sum of observation}}{\text{Total possibility}}$

∴ for a 2 dice roll, total possibility = $6^2 = 36$.

Sum of observation = getting a total of 3 or 5
= {(1,2) (2,1) (1,4) (4,1) (2,3) (3,2)}
= 6

∴ probability = $\frac{6}{36} = \frac{1}{6}$

Q2 In a single throw of 2 dice, find the probability of getting a total of 12.

Sol^n:

Total probability for 2 dice = $6^2 = 36$

Sum of observation = total of 12 = $\{(6,6)\} = 1$

$\therefore$ $\boxed{\text{Probability} = \frac{1}{36}}$

Q3) In a single throw of 2 dice, find the probability of getting a total of 11

Sol^n:

Total possibilities for 2 dice rolled = $6^2 = 36$

Sum of observations i.e. total of 11 = $\{(6,5)\ (5,6)\} = 2$

$\therefore$ $\boxed{\text{Probability} = \frac{2}{36} = \frac{1}{18}}$

Q4) In a throw of 2 dice, what is the probability of a doublet? (1,1) (2,2) (3,3) (4,4) (5,5) (6,6)

Sol^n:

Total possibility = $6^2 = 36$

doublet = $\{(1,1), (2,2), (3,3), (4,4)\ (5,5)\ (6,6)\} = 6$

$\therefore$ $\boxed{P = \frac{6}{36} = \frac{1}{6}}$

Q.5 In a throw of 2 dice, find the probability of getting even numbers as a sum of numbers on both dice.

Sol^n: Total possibility = $6^2 = 36$

even sum $\Rightarrow$ Refer 2 die set =

$$\left\{\begin{matrix} (1,1) & (1,3) & (1,5) \\ (2,2) & (2,4) & (2,6) \\ (3,1) & (3,3) & (3,5) \\ (4,2) & (4,4) & (4,6) \\ (5,1) & (5,3) & (5,5) \\ (6,2) & (6,4) & (6,6) \end{matrix}\right\} = 18$$

$\therefore$ $\boxed{P = \frac{18}{36} = \frac{1}{2}}$

Q6 In a single throw of 3 dice, find the probability of getting a total of 5.

Sol^n: 3 die roll, ∴ total possibility $= 6^3 = 216$

total of 5 $= \{(1,1,3)\ (3,1,1)\ (2,1,2)\ (2,2,1)\ (1,3,1)\ (1,2,1)\} = 6$

$$\text{Probability} = \frac{6}{216} = \frac{1}{36}$$

[Exercise 3 CARDS Based]

→ Total 52 cards in a pack
→ 13 cards of diamond } red color
→ 13 cards of heart }
→ 13 cards of club } black color
→ 13 cards of spade }

→ Total 16 face cards in a pack of 52 cards
- ↳ 4 Aces (one in each type)
- ↳ 4 Kings (one in each type)
- ↳ 4 Queens (one in each type)
- ↳ 4 Jacks (one in each type)

Q1: One card is drawn at random from the well shuffled pack of 52 cards. What is a probability of picking a black card?

Sol^n:

$$\text{Probability} = \frac{\text{Sum of obs.}}{\text{possibility}}$$

[Possibility = 52] as the cards are 52 in a pack

Sum of observation = 1 black colored card
= Total black colored cards = 13 + 13 = 26

∴ Sum of observations = 26

$$\therefore P = \frac{26}{52} = \frac{1}{2}$$

Q2. One card is drawn from a pack of 52 cards. What is the probability of picking a Ace of spades or Jack of Diamonds?

Soln:

Total possibilities = 52

Sum of obs = either Ace of spades or Jack of diamonds

= 1 (ace of spades is only 1) + 1 (Jack of diamonds is only 1)

= 1 + 1 = 2

∴ $P = \frac{2}{52} = \frac{1}{26}$

Q3 One card drawn at random from pack of 52 cards. What is the probability that the card is either a red card or a king?

Soln:

Total possibility = 52

Sum of obs = either a red card or king

26 (hearts & diamonds) + (2, as 2 already considered in hearts & diamonds so remaining king of club & spades)

= 26 + 2 = 28

∴ Probability = $\frac{28}{52} = \frac{7}{13}$

Q4 One card drawn from a pack of 52 cards. What is the probability of picking an Ace?

Soln:

Total possibility = 52

Sum of obs: Ace picking = 4 (there are 4 aces in pack of 52)

∴ probability = $\frac{4}{52} = \frac{1}{13}$

Q5 One card is drawn at random from a pack of 52 cards. What is the probability of picking up a club?

Sol^{n}:

Total possibilities = 52

Sum of observations = 13 (there are 13 cards of club in pack)

∴ $\boxed{P = \frac{13}{52} = \frac{1}{4}}$

Q6 One card is drawn at random from a well shuffled pack of 52 cards. What is the probability of picking a red Queen?

Sol^{n}: Total possibilities = 52

sum of obs = picking a red Queen = 2 (one for hearts & one for diamonds)

∴ $\boxed{\text{Probability} = \frac{2}{52} = \frac{1}{26}}$

Q7 One card drawn at random from a pack of 52 cards. What is the probability that the card is either a king or a Spade?

Sol^{n}: Total possibilities = 52

sum of obs. = a king (4, one for each type) or + a Spade (12, king already included, hence 12 & not 13)

= 16

∴ $\boxed{P = \frac{16}{52} = \frac{4}{13}}$

Q8 One card drawn a random from pack of 52 cards. What is the probability that the card is either a heart or a king?

Sol^{n}: Total possibilities = 52

Sum of obs = a heart (13) or + a king (3, one king already included in hearts hence 3 & not 4)

= 16

∴ $\boxed{P = \frac{16}{52} = \frac{4}{13}}$

Exercise 4 – Color Balls – 2 balls

Q1) Bag contains 6 Red balls & 4 yellow balls. 4 balls are picked at random. What is the probability that 3 are red and 1 is yellow?

Sol^n:

$$\text{Probability} = \frac{\text{Sum of observations}}{\text{Total possibilities}}$$

→ Sum of obs. = 3 red balls (out of 6) and 1 yellow ball (out of 4)

$= {}^6C_3 \times {}^4C_1$

$$\boxed{\text{Sum of obs.} = {}^6C_3 \times {}^4C_1}$$

→ Total possibility = 6 Red balls, 4 yellow balls & 4 balls are picked

= 4 balls out of 10

$$\boxed{\text{Total possibilities} = {}^{10}C_4}$$

$$\therefore \boxed{\text{Probability} = \frac{{}^6C_3 \times {}^4C_1}{{}^{10}C_4} = \frac{6\times5\times4 \times 4}{10\times9\times8\times7} = \frac{5\times4\times4}{10\times3\times7}}$$

$$\boxed{\text{Probability} = \frac{8}{21}}$$

Q2) Bag contains 6 Red, 4 yellow balls. 3 balls are picked at random. What is probability that 1 is red?

Sol^n:

$$\text{Probability} = \frac{{}^6C_1 \times {}^4C_2}{{}^{10}C_3} = \frac{6\times4\times3}{10\times9\times8}$$

→ Total 6+4 = 10 balls
→ We choose 3 out of 10
→ Total probabilities = ${}^{10}C_3$
→ 1 is red → 1 red chosen out of 6 red → ${}^6C_1$
→ 1 is red & 2 are yellow out of 4 yellow → ${}^4C_2$
∴ $\left[{}^6C_1 \times {}^4C_2\right]$

$$\boxed{\text{Probability} = \frac{6\times2\times3}{10\times3\times4} = \frac{3}{10}}$$

Q3) Bag contains 6 Red and 4 yellow balls. 2 balls are picked at random. What is the probability that either 2 are red or 2 are yellow?

Soln:

2 red or 2 yellow

${}^6C_2 + {}^4C_2$

Total possibilities = 2 out of 10 = ${}^{10}C_2$

$$\text{Probability} = \frac{{}^6C_2 + {}^4C_2}{{}^{10}C_2} = \frac{\frac{6\times5}{1\times2} + \frac{4\times3}{1\times2}}{\frac{10\times9}{1\times2}}$$

$$\boxed{\text{Probability} = \frac{15+6}{45} = \frac{7}{15}}$$

Q4) Bag contains 6 Red & 4 yellow balls. 3 balls are picked at random. What is the possibility that none is red?

Soln:

non red balls out of 3 selection

↳ 3 balls selected are from yellow.

& → Total possibility is selecting 3 out of 10

$$\therefore \text{probability} = \frac{{}^4C_3}{{}^{10}C_3} = \frac{\frac{4\times3\times2}{1\times2\times3}}{\frac{10\times9\times8}{1\times2\times3}}$$

$$\boxed{\text{Probability} = \frac{1}{30}}$$

Q5) Bag contains 6 Red & 4 yellow balls. 4 balls are picked at random. What is the probability atleast one is red?

Soln:

Atleast : minimum ⟶ maximum

↳ { min (1 red) + 2 (red) + 3 (red) + 4 (red) }

Total probability = 4 out of 10 = ${}^{10}C_4$

$$\therefore P = \frac{{}^6C_1 * {}^4C_3 + {}^6C_2 * {}^4C_2 + {}^6C_3 * {}^4C_1 + {}^6C_4}{{}^{10}C_4}$$

$$\boxed{\text{Probability} = \frac{209}{210}}$$

Q6) Bag contains 6 Red & 4 yellow balls. 3 balls are picked at random. What is the probability atmost 2 are red?

Sol^n:

Atmost: maximum ⟶ minimum.

∴ ↳ { max (2 red) & 1 yellow or 1 red & 2 yellow or no red & 3 yellow }

$= {}^6C_2 \times {}^4C_1 + {}^6C_1 \times {}^4C_2 + {}^4C_3$

$$\text{Probability} = \frac{{}^6C_2 \times {}^4C_1 + {}^6C_1 \times {}^4C_2 + {}^4C_3}{{}^{10}C_3} = \frac{5}{6}$$

Q7 Bag contains 6 Red & 4 yellow balls. 4 balls are picked at random. What is the probability that 3 balls are red and 1 is yellow or 2 are red and two are yellow?

Sol^n:

3 red (×) 1 yellow (+) 2 red (×) 2 yellow

$= {}^6C_3 \times {}^4C_1 + {}^6C_2 \times {}^4C_2$

∴ $$\text{Probability} = \frac{{}^6C_3 \times {}^4C_1 + {}^6C_2 \times {}^4C_2}{{}^{10}C_4} = \frac{17}{21}$$

Exercise 5 – 3 color balls

Q1) Bag contains 6 Red balls, 4 yellow and 2 Green balls. 4 balls are picked at random. What is the probability that two are red, one is yellow and one is green?

Soln:

Total possibility = choose 4 balls out of total $6+4+2 = 12$ balls.

$\therefore$ Total possibility $= {}^{12}C_4$

2 red and 1 yellow and 1 green

${}^6C_2 \times {}^4C_1 \times {}^2C_1$

$$\text{Probability} = \frac{{}^6C_2 * {}^4C_1 * {}^2C_1}{{}^{12}C_4} = \frac{8}{33}$$

Q2) Bag contains 6 Red, 4 yellow and 2 green balls. 4 balls are picked at random. What is the probability 2 are red?

Soln:

Total possibility = 4 chosen out of $6+4+2 = {}^{12}C_4$

2 are red (and) (hence remaining 2 are among yellow and green)

$\Rightarrow {}^6C_2 * (4 \text{ yellow} + 2 \text{ green balls})$ choose 2 out of it

$\Rightarrow {}^6C_2 * {}^6C_2$

$\therefore$ $$\text{Probability} = \frac{{}^6C_2 * {}^6C_2}{{}^{12}C_4} = \frac{5}{11}$$

Q3) Bag contains 6 Red, 4 yellow and 2 green balls. 5 balls are picked at random. What is the probability that none is yellow.

Sol^n:

→ Total possibility = 5 balls chosen out of 12 balls → $^{12}C_5$

→ no yellow balls hence 5 balls to be chosen from 6 red & 2 green

→ 5 balls to be chosen from total 8 balls → $^{8}C_5$

$$\text{Probability} = \frac{^{8}C_5}{^{12}C_5} = \frac{7}{99}$$

Q4) Bag contains 6 Red, 4 yellow & 2 green balls. 2 balls are picked at random. What is the probability

(i) Either both are red or both are green

(ii) Neither red nor green:

Sol^n Total possibility = 2 balls chosen out of 12 → $^{12}C_2$

(i) both red or both green

$$^{6}C_2 + {}^{2}C_2$$

$$\text{Probability} = \frac{^{6}C_2 + {}^{2}C_2}{^{12}C_2} = \frac{8}{33}$$

(ii) no red or no green i.e. all yellow → $^{4}C_2$

$$\text{Probability} = \frac{^{4}C_2}{^{12}C_2} = \frac{1}{11}$$

Q5) Bag contains 6 Red, 4 yellow and 2 green balls. 3 balls are picked at random. What is the possibility that atleast one is red?

Sol^n: Total possibilities → 3 choose out of 12 → $^{12}C_3$

Atleast : minimum ⟶ maximum

minimum (1 red) & 2 (green + yellow) $\underset{4+2=6}{}$ or 2(red) & 1 (green + yellow) or 3(red) & 0(g+yel)

$^6C_1 * {}^6C_2 + {}^6C_2 * {}^6C_1 + {}^6C_3$

∴ Probability = $\dfrac{(^6C_1\ {}^6C_2) + (^6C_2\ {}^6C_1) + {}^6C_3}{^{12}C_3} = \dfrac{10}{11}$

Q6) Bag contains 6 Red, 4 yellow and 2 green balls. 3 balls are picked at random. What is the probability that atmost 2 are yellow?

Sol^n: Total possibilities → $^{12}C_3$

atmost : maximum ⟶ minimum

[max (2 yellow) & 1 (red + green, 6+2=8)] or [1 (yellow) and 2 (red + green)] or [0 (yell) and 3 (red + g)]

$[^4C_2 * {}^8C_1] + [^4C_1 * {}^8C_2] + [{}^8C_3]$

Probability = $\dfrac{(^4C_2\ {}^8C_1) + (^4C_1\ {}^8C_2) + {}^8C_3}{^{12}C_3} = \dfrac{54}{55}$

Q7) Bag contains 6 Red, 4 yellow and 2 Green balls. 3 balls are picked at random. What is the probability that:

2 red and 1 is green or 1 is yellow and 2 are green

Sol^n:

[2 red & 1 green] or [1 yellow and 2 green]

$P = \dfrac{[^6C_2\ {}^2C_1] + [^4C_1\ {}^2C_2]}{^{12}C_3} = \dfrac{17}{110}$

Exercise – 6 – Memory Based

Q1) Bag contains 7 Blue, 5 yellow balls. If 2 balls are selected at random, what is the probability that none is yellow?

Sol^n:

Total possibility $\Rightarrow$ 2 out of $7+5=12 \rightarrow {}^{12}C_2$

none is yellow i.e. they are blue $\rightarrow {}^{7}C_2$

$\therefore$ probability $= \frac{{}^{7}C_2}{{}^{12}C_2} = \frac{7}{22}$

Q2) Bag contains 8 brown, 4 orang & 5 black balls. Five balls are chosen at random. What is probability of their being: 2 brown, 1 orang and 2 black balls?

Sol^n: Total possibilities $= 8+4+5 = 17$, chose 5 out of 17

$\therefore$ Total possibilities $= {}^{17}C_5$

2 brown and 1 orange and 2 black

${}^{8}C_2 * {}^{4}C_1 * {}^{5}C_2$

$P = \frac{{}^{8}C_2 * {}^{4}C_1 * {}^{5}C_2}{{}^{17}C_5} = \frac{40}{221}$

Q3) Bag contains 13 white and 7 black balls. 2 balls are drawn at random. What is the probability that they are of same color?

Sol^n:

Same color i.e. either 2 white or 2 black

${}^{13}C_2 + {}^{7}C_2$

$\therefore P = \frac{{}^{13}C_2 + {}^{7}C_2}{{}^{20}C_2} = \frac{99}{190}$

Q4) Bag contains 3 red and 4 green balls. 3 are chosen at random. What is the probability that 2 are green and 1 is red?

Sol":

2 green and 1 red

$^4C_2 \times {}^3C_1$

$$P = \frac{{}^4C_2 \, {}^3C_1}{{}^7C_3} = \frac{18}{35}$$

Q5) Bag contains 9 red, 7 white and 4 black balls. If 2 balls are picked at random, find the probability that both the balls are red.

Sol":

both are red $\rightarrow {}^9C_2$

Total possibilities $\rightarrow {}^{20}C_2$

$$P = \frac{{}^9C_2}{{}^{20}C_2} = \frac{18}{95}$$

Q6) Bag contains 2 red, 3 green and 2 blue balls. 2 balls are to be drawn randomly. What is the possibility that the balls drawn contain no blue ball?

Sol":

no blue ball $\therefore$ 2 balls from red & green

$3 + 2 = 5$

$\therefore {}^5C_2$

$$P = \frac{{}^5C_2}{{}^7C_2} = \frac{10}{21}$$

Q7) Box contains 4 black, 3 red & 5 green balls. 2 balls to be picked at random. What is the probability that both are of the same color?

Sol^{n}:

Total possibility = 4+3+5 = 12 choose 2 → $^{12}C_2$

both of same color.

i.e. 2(black) or 2(red) or 2(green)

$^{4}C_2$ + $^{3}C_2$ + $^{5}C_2$

∴ $\text{Probability} = \dfrac{^{4}C_2 + {}^{3}C_2 + {}^{5}C_2}{^{12}C_2} = \dfrac{19}{66}$

Q8) Out of 5 girls & 3 boys, 4 children are to be randomly selected for a quiz contest. What is the probability that all are girls?

Sol^{n}:

Total possibility = 5+3 = 8 choose 4 = $^{8}C_4$

all girls i.e. 4 girls → $^{5}C_4$

∴ $P = \dfrac{^{5}C_4}{^{8}C_4} = \dfrac{1}{14}$

Q9) Bag contains 3 Red, 2 green, 6 blue, 4 yellow balls. 4 balls are picked at random. What is the possibility/probability that atleast one is yellow?

Sol^{n}: Total possibility = 3+2+6+4 = 15 choose 4 → $^{15}C_4$

[atleast : min → max]

min (1 yellow) & 3 from (RGB) or 2(yellow) & 2(RGB) or 3(yellow) & 1(RGB) or 4 yellow & 0(RGB)

× + × + × + ×

$$P = \frac{(^{4}C_1 \times {}^{11}C_3) + (^{4}C_2 \times {}^{11}C_2) + (^{4}C_3 \times {}^{11}C_1) + {}^{4}C_4}{^{15}C_4} = \frac{69}{91}$$