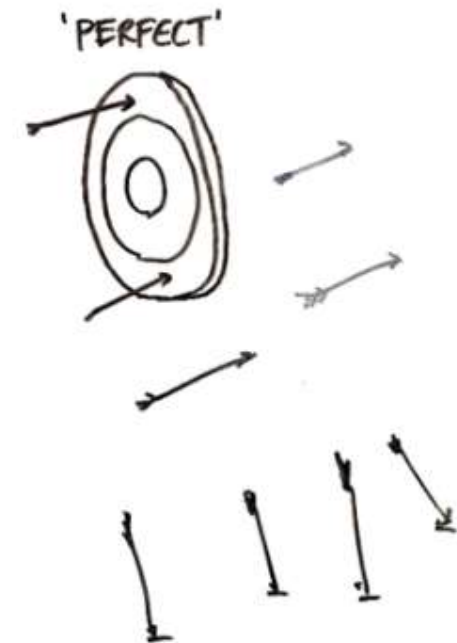


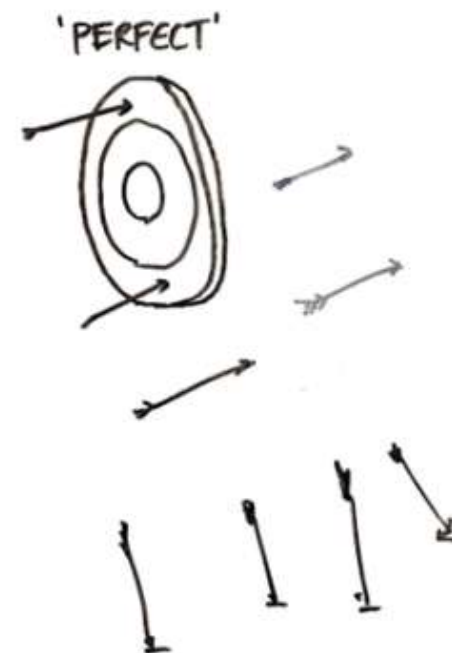
• Practice:

1. A box contains 3 blue marbles, 4 red, 6 green marbles and 2 yellow marbles. If two marbles are drawn at random, what is the probability that at least one is green?
2. A box contains 3 blue marbles, 4 red, 6 green marbles and 2 yellow marbles. If two marbles are picked at random, what is the probability that they are either blue or yellow?
3. A box contains 3 blue marbles, 4 red, 6 green marbles and 2 yellow marbles. If four marbles are picked at random, what is the probability that none is blue?
4. 10 books are placed at random in a shelf. The probability that a pair of books will always be together is?
5. What is the probability that a leap year has 53 Sundays and 52 Mondays?
6. Out of 20 consecutive integers, two are chosen at random. The probability that their sum is odd is?
7. A box contains 3 blue marbles, 4 red, 6 green marbles and 2 yellow marbles. If three marbles are drawn what is the probability that one is yellow and two are red?



• Practice:

8. Out of 10 persons working on a project, 4 are graduates. If 3 are selected, what is the probability that there is at least one graduate among them?
9. In a party there are 5 couples. Out of them 5 people are chosen at random. Find the probability that there are at the least two couples?
10. The probability of a lottery ticket being a prized ticket is 0.2. When 4 tickets are purchased, the probability of winning a prize on atleast one ticket is?
11. There are two boxes, one containing 39 red balls & the other containing 26 green balls. You are allowed to move the balls between the boxes so that when you choose a box random & a ball at random from the chosen box, the probability of getting a red ball is maximized. This maximum probability is
12. There are 6 red balls, 8 blue balls and 7 green balls in a bag. If 5 are drawn with replacement, what is the probability at least three are red?



① $T(m) = 3 + 4 + 6 + 2$ total marbles $= {}^{15}C_2 = \frac{15 \times 14}{2} = 105$

Not green $\rightarrow 3 + 4 + 2 = 9$

2 no green: ${}^9C_2 = 36$

$P(\text{no green}) = \frac{36}{105} = \frac{12}{35}$

Final $= 1 - \frac{12}{35} = \frac{35 - 12}{35} = \frac{23}{35}$

② b (or) yellow $= 3 + 2 = 5$
 ${}^{15}C_2 = \text{Total} \Rightarrow 105$

2 marbles \rightarrow b (or) yellow

5C_2

probability $= \frac{{}^5C_2}{{}^{15}C_2} = \frac{\frac{5 \times 4}{2}}{\frac{15 \times 14}{2}} = \frac{2}{21}$

③ Total $= 3 + 4 + 6 + 2 = 15$

No-green $= 15 - 3 = 12$

$P = \frac{{}^{12}C_4}{{}^{15}C_4} = \frac{33}{105} = \frac{11}{35}$

${}^{30}C_4$
 $\frac{30 \times 29 \times 28 \times 27}{4 \times 3 \times 2 \times 1}$

4] Total = 10!

favorable arrangement :-

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

$9! \times 2!$

probability = $\frac{9! \times 2!}{10!} = \frac{2}{10} = \frac{1}{5}$

5 Leap year = 366

$366 \div 7 = 52 \text{ weeks and } 2 \text{ day extra}$

53 Sundays

→ (S, M) (S, S)

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

6 Total ways to choose = $20C_2 = \frac{20 \times 19}{2}$

No. of odd & even = $10C_1 \times 10C_1 = 10 \times 10$

probability = $\frac{100}{190} = \frac{10}{19}$

7 Total = 13

Total ways = 3 = $\binom{15}{3} = 455$

ways to choose 1 yellow and 2 red

$\binom{2}{1} \times \binom{4}{2} = 2 \times 6 = 12$

probability = $\frac{12}{455}$

⑧ T number $3 \text{ out } 10 = {}^{10}C_3 = 120$

3 green hats out of 6 $= {}^6C_3 = 20$

no green hats $= \frac{20}{120} = \frac{1}{6}$

probability at least one $= 1 - \frac{1}{6} = \frac{5}{6}$

⑨ T number $= {}^{10}C_8 = 252$

no of ways two courses

$5C_2 \times 6C_1 = 10 \times 6 = 60$

no of ways $= 0$

probability $= \frac{60}{252} = \frac{5}{21}$

⑩ Ticket $= 1 - 0.2 = 0.8$

4 ticket $0.84 = 0.4096$

$1 - 0.4096 = 0.5904$

0.5904

$P = \frac{1}{2} \times \frac{39}{39+10} + \frac{1}{2} \times 0 = \frac{39}{2(39+10)} \quad P = \frac{39}{2 \times 49} = \frac{39}{98}$

$P = \frac{1}{2} \times \frac{38}{38} + \frac{1}{2} \times \frac{1}{20} = \frac{1}{2} + \frac{1}{40} = \frac{20}{40} + \frac{1}{40} = \frac{21}{40}$

⑧ Tinker $3 \text{ out of } 10 = {}^{10}C_3 = 120$

3 greaches out of $= {}^6C_3 = 20$

no greache $= \frac{20}{120} = \frac{1}{6}$

probability at least one $= 1 - \frac{1}{6} = \frac{5}{6}$

⑨ Tinker $= {}^{10}C_5 = 252$

No of way two couples

$5C_2 \times 6C_1 = 10 \times 6 = 60$

No of way $= 0$

probability $= \frac{60}{252} = \frac{5}{21}$

⑩ Ticket $= 1 - 0.2 = 0.8$

4 ticket $0.8^4 = 0.4096$

$1 - 0.4096 = 0.5904$

0.5904

11] $P = \frac{1}{2} \times \frac{39}{39+1} + \frac{1}{2} \times 0 = \frac{39}{2(39+1)} = \frac{39}{80}$

$P = \frac{1}{2} \times \frac{38}{38} + \frac{1}{2} \times \frac{1}{28} = \frac{1}{2} + \frac{1}{56} = \frac{28}{56} + \frac{1}{56} = \frac{29}{56}$

12] 7 balls $\therefore 6+1+0=2$

$$p = \frac{6}{21} = \frac{2}{7}$$

$$P(\text{at least 3}) = P(3) + P(4) + P(5)$$

$$P(k) = \binom{5}{k} \left(\frac{2}{7}\right)^k \left(\frac{5}{7}\right)^{5-k}$$

$$P(3) = \binom{5}{3} \left(\frac{2}{7}\right)^3 \left(\frac{5}{7}\right)^2 = 10 \times \frac{8}{343} \times \frac{25}{49}$$

$$= \frac{10 \times 200}{16807} = \frac{2000}{16807}$$

$$P(4) = \binom{5}{4} \left(\frac{2}{7}\right)^4 \left(\frac{5}{7}\right)^1 = 10 \times \frac{32}{16807} = \frac{320}{16807}$$

$$P(\text{at least 3}) = \frac{2000 + 320 + 32}{16807} = \frac{2432}{16807}$$