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# GENERAL APTITUDE

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# Ratio & Proportion(Poll)

Q. The incomes of A & B are in the ratio 3:2. Their respective expenditures are in the ratio 5:3. If each of them saves Rs. 2000, what is the income of B?

A. Rs 12,000      B. Rs 8,000      C. Rs 16,000      D. Rs 6,000

**Ans : B**



# Percentage

- Percentage is a fraction whose denominator is 100(per 100)

Fract ion x100	% ÷100	Fracti on	%	Fracti on	%	Fracti on	%	Fracti on	%
				1/1	100%	1/6	16.66 %	1/11	9.09 %
3/4	75%	5/4	125%						
4/5	80%	3/2	150%	1/2	50%	1/7	14.28 %	1/12	8.33 %
2/3	66.66 %	1/16	6.25%	1/3	33.33 %	1/8	12.5 %	1/13	7.69 %
5/6	83.33 %			1/4	25%	1/9	11.11 %	1/14	7.14 %
6/5	120%			1/5	20%	1/10	10%	1/15	6.66 %



# Percentage

Q.  $x$  is 83.33% of  $y$ . So  $y$  is \_\_\_\_\_% of  $x$

## Solution:

$$x = 83.33y$$

$$x = \frac{5}{6} y$$

$$\text{So, } y = \frac{6}{5} x$$

$y = 120\%$  (from chart)

Fraction $\times 100$	%	Fraction	%
	100		
$3/4$	75%	$5/4$	125%
$4/5$	80%	$3/2$	150%
$2/3$	66.66 %	$1/16$	6.25%
$5/6$	83.33 %		
$6/5$	120%		



# Percentage

Q. x is 80% of y. So y is \_\_\_\_\_% of x

Solution:

$$x = 80y$$

$$x = \frac{4}{5} y$$

$$\text{So, } y = \frac{5}{4} x$$

$$y = 125\%$$



# Percentage

Q. A number x is increased by 20% then the number is decreased by 20%. Find the net % change.

- **Soln** :
- If a number is increased / decreased by x% then there is always a loss of  $-(x/10)^2$
- Net % Change =  $-(20/10)^2 = -(400/100) = -4\%$  (loss)
- **OR**
- Let the number be 100
- $100 \uparrow$  by 20% = 120
- So  $20\% \downarrow$  of 120 = 96

• 100      120      96

-4% = net change




# Percentage

Q. A number  $x$  is increased by 50% then the number is increased by 20% and again by 10%. Find the net % change

**Soln:**

- Let the number be 100
- $100 \uparrow$  by 50% = 150
- Again,  $150 \uparrow$  by 20% = 30, So  $150 + 30 = 180$
- $10\% \uparrow$  of 180 = 18, So,  $180 + 18 = 198$

• 100      150      180      198



98% = net change



# Percentage

- **Two Step change of Percentage**

In first step if number is changed by a% and the result is again changed by b% the net percentage change of original number is given by

$$\text{Net \% Change in Number} = a + b + \frac{ab}{100} \quad (+ve \text{ or } -ve)$$





# Percentage

Q. If a number is increased by 12 % & then decreased by 18% then the net % change in number is

**Soln:**

**Net % Change in Number =  $a + b + \frac{ab}{100}$  (+ve or -ve)**

$$\begin{aligned}\% \text{ Change} &= 12 - 18 + (12 \times -18)/100 \\ &= -6 - 2.16 \\ &= -8.16\%\end{aligned}$$



# Percentage

- Percentage Change & effect on Product

If  $A \times B = \text{Product}$

If A is changed by  $a\%$  & also B is changed by  $b\%$  then

**Net % Change in Product =  $a + b + \frac{ab}{100}$  (+ve or -ve)**



# Percentage

Q. Find % Change of area of rectangle if length increases by 30% & breadth decreases by 12%

**Soln :**

**Net % Change in Number =  $a + b + \frac{ab}{100}$  (+ve or -ve)**

$$\begin{aligned}\% \text{ Change of Area} &= +30 - 12 + (30 \times -12)/100 \\ &= 18 - 3.6 = + 14.4\%\end{aligned}$$



# Percentage

Q. If the radius of a circle is decreased by 50%, find the percentage decrease in its area.

- A. 55%
- B. 65%
- C. 75%
- D. 85%

• **Soln:**

- Area of a circle =  $\pi r^2$  where  $r$  is the radius  
 $\Rightarrow$  Area is directly proportional to  $r^2$

- Assume the old radius is  $= r_1 = 100$

- $A_1 = \pi \times 100^2 = 10000\pi$

Assume the new radius is  $= r_2 = 50$

$$A_2 = \pi \times 50^2 = 2500\pi$$

$$\text{Decrease in area} = 10000\pi - 2500\pi = 7500\pi$$

$$\text{Percentage decrease in area} = \frac{\text{difference}}{\text{old}} \times 100 = \frac{7500\pi}{10000\pi} \times 100 = 75\%$$

- **Ans : C**



# Percentage

- Expenditure = Price x Consumption
- $P \propto \frac{1}{\text{Consumption}}$
- So, for expenditure to remain constant, when one quantity increases the other quantity should decrease proportionally.
- **Eg:** If the price of a commodity is decreased by 20% and its consumption is increased by 20%, what will be the increase or decrease in expenditure on the commodity?
- Soln:

**Net % Change = a + b + ab/100 (+ve or -ve)**

$$\begin{aligned}\% \text{ Change} &= -20 + 20 + (-20 \times 20)/100 \\ &= 0 - 4 = -4\%\end{aligned}$$

**OR**

100  $\implies$  20% $\downarrow$ (Decrease in Price)  $\implies$  80  $\implies$  20% $\uparrow$ (Increase in Consumption)  $\implies$  96.  
| Thus, there is a decrement of 4%



# Percentage

Q. Two numbers are respectively 40% and 60% more than a third number. The ratio of the two numbers is:

A. 7:8

B. 3 : 5

C. 4 : 5

D. 6 : 7

**Soln:-**

- Let the third number be 100
- First number = 40% more than 100 =  $100 + 40\% \text{ of } 100 = 100 + 40 = 140$
- Second number = 60% more than 10 =  $x + 60\% \text{ of } 100 = 100 + 60 = 160$
- Ratio =  $\frac{\text{first number}}{\text{second number}} = \frac{140}{160} = \frac{7}{8} = 7 : 8$

**Ans: A**



# Percentage using x

Q. Two numbers are respectively 40% and 60% more than a third number. The ratio of the two numbers is:

A. 7:8

B. 3 : 5

C. 4 : 5

D. 6 : 7

**Soln:-**

- Let the third number be x.

- First number = 40% more than x =  $x + 40\% \text{ of } x = x + \frac{40}{100}x = \frac{100x+40x}{100} = \frac{140x}{100}$

- Second number = 60% more than x =  $x + 60\% \text{ of } x = x + \frac{60}{100}x = \frac{100x+60x}{100} = \frac{160x}{100}$

- Ratio =  $\frac{\text{first number}}{\text{second number}} = \frac{\frac{140x}{100}}{\frac{160x}{100}} = \frac{140x}{160x} = \frac{7}{8} = 7 : 8$

**Ans: A**



## Percentage(Assignment)

Q. If the price of sugar increases by 25%, by what percent will a housewife have to reduce her consumption to leave total expenditure on sugar unchanged?

- A. 25%      B. 35%      C. 20%      D. 15%

**Ans: C**





# Percentage(Assignment)

Q. 1.14 expressed as a per cent of 1.9 is:

- A. 6%                      B. 10%                      C. 60%                      D. 90%

Ans: C



## Percentage(Assignment)

Q. A number  $x$  is increased by 20% then the number is increased by 10% and again by 50%. Find the net % change.

A. 77%      B. 75%      C. 88%      D. 98%      E. 99%

**Ans : D**



# Percentage(Assignment)

Q. If the altitude of a triangle increases by 5% and the base of the triangle increases by 7%, by what percent will the area of the triangle increase?

A. 12.25%    B. 12.35%    C. 6.00%    D. 5.25%

**Ans B**



## Percentage(Assignment)

Q. The length and breadth of a room are increased by 25% and 40% respectively. While the height is decreased by 20%. Find % change.

A. 16%

B. 40%

C. 60%

D. 30%

**Ans B**



## Percentage(Assignment)

Q. If the length of a rectangle is increased by 37.5% and its breadth is decreased by 20%, find the change in its area.

A. 15% increase B. 13% decrease C. 10% increase D. 10% decrease

**Ans: C**



# Profit & Loss

- Basics

Profit (Gain) = (S.P – C.P)

Loss =(C.P – S.P)

% gain = (Gain / C.P) x 100

% loss = (Loss / C.P) x 100

- Multipliers to find S.P

In Case of Profit : S.P. = C.P. x **(100 +%gain)/100**

In Case of Loss : S.P. = C.P. x **(100 - %loss)/100**

i.e For sale at 25% profit S.P. = 125 % of C.P.

For sale at 25% loss S.P. = 75% of C.P.



# Profit & Loss

Q. A man bought certain no of oranges at the rate of 5 for Rs 4 and sold them at the rate of 4 for Rs 5. Find his overall profit/loss percentage?

A. 25.5% Pr

B. 36.5% Pr

C. 56.2% Pr

D. 64.5% Pr

**Soln**

Cost Price

Oranges→	Rs	Oranges→	Rs
5 →	4	4 →	5
20 →	16	20 →	25

SP>CP, so profit

$$\begin{aligned}P\% &= (SP - CP)/CP \times 100 \\&= (25-16)/16 \times 100 \\&= 225/4 = 56.20\%\end{aligned}$$

**Ans: C**

Cost Price

Oranges→	Rs
5 →	4
1 →	$\frac{4}{5}$

Selling Price

Oranges→	Rs
4 →	5
1 →	$\frac{5}{4}$

SP>CP, so profit

$$\begin{aligned}P\% &= (SP - CP)/CP \times 100 \\&= \frac{\left(\frac{5}{4} - \frac{4}{5}\right)}{\frac{4}{5}} \times 100 = \frac{\left(\frac{9}{20}\right)}{\frac{4}{5}} \times 100 \\&= 225/4 = 56.20\%\end{aligned}$$



# Profit & Loss

Q. A man bought a horse & carriage together for Rs 15600 & sold them together, the horse at 36% profit & the carriage at 15% loss. If selling price of both is equal. Find the cost of the carriage?

A. Rs.6000

B. Rs.7600

C. Rs.3600

D. Rs.9600

- **Soln**

- Let CP of horse be H & Carriage be C  $\rightarrow H+C= 15600$

- SP of both is equal

- So, comparing the CPs

- $136H/100 = 85C/100$

- $H = 5C/8$

- $5C/8 + C = 15600$

- $13C/8 = 15600$

- $C = 1200 \times 8$

- $C = 9600$

**Ans: D**





# Profit & Loss

Q. If selling price is doubled, the profit triples. Find the profit %.

A.  $66\frac{2}{3}\%$

B. 100%

C.  $105\frac{1}{3}\%$

D. 120%

**Soln:**

Let, CP = C , SP=S

As they ask profit % , we know profit = SP – CP

As per given,

$$3(S-C) = 2S-C$$

$$3S - 3C = 2S - C$$

$$S = 2C$$

$$\text{But, Profit} = S - C = 2C - C = C$$

$$\text{Profit \%} = \frac{\text{profit}}{\text{CP}} \times 100 = \frac{C}{C} \times 100 = 100\%$$

**Ans : B**



# Profit & Loss

Q. A shopkeeper sells his goods at 20% profit and to make an extra profit he gives only 800 gm per kg. Find his profit %

A. 25% Pr      B. 33.33% Pr      C. 50% Pr      D. 25% Ls

**Soln**

CP	SP	Profit
100	120	20
80	120	40
% Profit	$= 40/80 \times 100$ $= 1/2 \times 100$ $= 50\%$	

**Ans: C**



# Alligation

Q. A person blends two varieties of tea , one cost Rs. 160/kg and other cost Rs. 200/kg in the ratio 5 : 4. He sells the blended variety at Rs.192/kg. Find the profit %.

Soln :

$$\frac{x}{y} = \frac{d-m}{m-c}$$
$$\frac{5}{4} = \frac{200-m}{m-160}$$

$$5m - 800 = 800 - 4m$$

$$9m = 1600$$

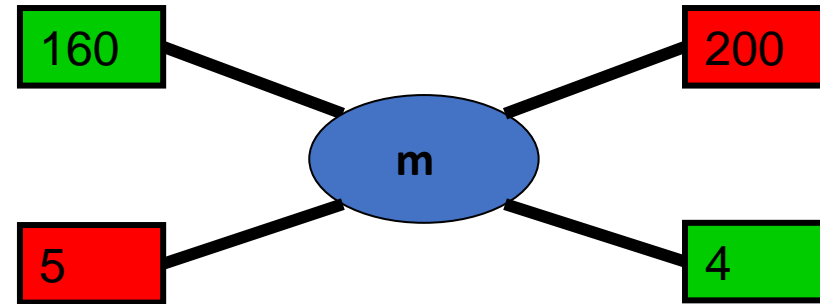
$$m = \frac{1600}{9}$$

SP=Rs.192(given) , CP =mean price

$$\text{Profit\%} = \frac{\text{SP}-\text{CP}}{\text{CP}} \times 100$$
$$= \frac{192 - \frac{1600}{9}}{\frac{1600}{9}} = \frac{1728 - 1600}{1600} = \frac{128}{16} = 8\%$$

cheaper price

dearer price



# Profit & Loss(Assignment)

**Q. A bookseller sells 84 books at the cost of 72 books. Find his profit or loss%**

**A. 14.28%    B. 28.24%    C. 20.4%    D. 12.86%**

**Ans : A**



# Profit & Loss(Assignment)

**Q. A vendor bought 6 oranges for Re 10 and sold them at 4 for Re 6. Find his loss or gain percent.**

**A. 8% gain**

**B. 10% gain**

**C. 8% loss**

**D. 10% loss**

**Ans: D**



# Profit & Loss(Assignment)

**Q. A shopkeeper sells his goods at 10% loss but uses a weight of 750gms instead of 1kg. Find profit %**

- A. 20% Pr      B. 14.28% Pr      C. 30% Pr      D. 25% Ls**

**Ans: A**



# Profit & Loss(Assignment)

**Q. A fruit seller buys oranges at 4 for Rs. 3 and sells them at 3 for Rs. 4. Find its profit percent.**

**A. 43.75% Pr**

**B. 77.7% Pr**

**C. 75% Pr**

**D. 65.7% Ls**

**Ans: B**



# Profit & Loss(Assignment)

Q. A man buys a cycle for Rs. 1400 and sells it at a loss of 15%. What is the selling price of the cycle?

A. Rs. 1090

B. Rs. 1160

C. Rs. 1190

D. Rs. 1202

**Ans: C**





# Profit & Loss(Assignment)

Q. 100 oranges are bought at the rate of Rs. 350 and sold at the rate of Rs. 48 per dozen. The percentage of profit or loss is:

- A.  $14\frac{2}{7}\%$  gain      B. 15% gain      C.  $14\frac{2}{7}\%$  loss      D. 15 % loss

**Ans: A**



# Probability

- How likely an event is supposed to happen.
- $\text{Probability} = \frac{\text{Favourable outcome}}{\text{Total number of outcomes}}$
- AND  $\rightarrow$  multiply(x) e.g:- 1 green and 1 blue ball in a box
- OR  $\rightarrow$  Add (+) e.g:- 1 red or 1 blue ball in a box
- 1 bag has 3 balls, what is the probability of you picking up 2 balls?

$$\bullet \quad {}^3C_2 = \frac{3 \times 2}{1 \times 2} = 3$$

Total no. of balls  
the bag contains

Out of which how many balls  
We need to choose  
(tells number of times 3 has to be reduces)

$$\text{Probability} = \frac{\text{Favourable outcome}}{\text{Total number of outcomes}}$$



# Points to Remember

- The **probability** of an event will not be less **than** 0.
- This is because 0 is impossible (sure that something will not happen).
- The **probability** of an event will not be **more than** 1. This is because 1 is certain that something will happen.
- The probability of an event is **a number** describing the chance that the event will happen.
- An event that is certain to happen has a probability of 1.
- An event that cannot possibly happen has a probability of 0.
- If there is a chance that an event will happen, then its probability is between 0 & 1.



# Probability

- **Atleast** – min to max

- Eg:- 2 bags out of 3



So various probabilities to be done is 2 and 3

- **Atmost** - max to min

- Eg:- 1 bag has 3 balls out of which probability to pick up 2 balls

A diagram illustrating the 'Atmost' concept. It shows the text 'probability to pick up 2 balls'. Below '2' is a blue arrow pointing down to the text 'atmost 2'. To the right of 'atmost 2' is an arrow pointing to the text 'max 2 , 1 , 0 (min)'.

atmost 2 → max 2 , 1 , 0 (min)



# Probability

Q. A bag contains 2 red, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?

A. 10/21      B. 11/21      C. 2/7      D. 5/7

• Soln-

- Total balls = 2+3+2 =7 balls in the bag
- None = blue (neglect whichever color is written after none)
- Draw =2 balls

• Probability =  $\frac{\text{Favourable outcome}}{\text{Total number of outcomes}} = \frac{2R \text{ or } (1R \text{ and } 1G) \text{ or } 2G}{7C_2} = \frac{2C_2 + (2C_1 \times 3C_1) + 3C_2}{7C_2} = \frac{10}{21}$

**Ans : A**



# Probability

Q. In a box, there are 8 red, 7 blue and 6 green balls. One ball is picked up randomly. What is the probability that it is neither red nor green?

A.  $\frac{1}{3}$       B.  $\frac{3}{4}$       C.  $\frac{7}{19}$       D.  $\frac{8}{21}$       E.  $\frac{9}{21}$

**Soln:**

- Total balls =  $8+7+6 = 21$  balls in the box
- Neither red nor green means only blue
- Draw = 1 ball

$$\bullet \text{ Probability} = \frac{\text{Favourable outcome}}{\text{Total number of outcomes}} = \frac{1 \text{ blue out of total } 7}{21C_1} = \frac{7C_1}{21C_1} = \frac{7}{21} = \frac{1}{3}$$

**Ans: A**



# Probability

Q. What is the probability of getting a sum 5 from two throws of a dice?

- A.  $1/9$                       B.  $1/8$                       C.  $1/7$                       D.  $1/6$

**Soln-**

**Dice = 6 faces = 6 possibilities**

So in two throws of dice, total possibilities =  $6 \times 6 = 36$

Sum = 5, so favourable outcomes are -  $\{ (1,4), (4,1), (2,3), (3,2) \}$

$$\text{Probability} = \frac{\text{Favourable outcome}}{\text{Total number of outcomes}} = \frac{4}{36} = \frac{1}{9}$$

**Ans : A**



# Probability

Q. Three unbiased coins are tossed. What is the probability of getting utmost two heads?

- A.  $\frac{3}{4}$       B.  $\frac{1}{4}$       C.  $\frac{3}{8}$       D.  $\frac{7}{8}$

• **Soln-**

- Total possibilities = {TTT, TTH, THT, HTT, THH, HTH, HHT, HHH}
- Event of getting utmost 2 heads = max 2H or 1H or 0H
- Possibility of getting 2 H = {TTH, THT, HTT, THH, HTH, HHT}
- Probability =  $\frac{\text{Favourable outcome}}{\text{Total number of outcomes}} = \frac{7}{8}$

**Ans: D**





# Probability

Q. In a class, there are 15 boys and 10 girls. Three students are selected at random. The probability that 1 girl and 2 boys are selected, is:

A.  $21/46$

B.  $25/117$

C.  $1/50$

D.  $3/25$

**Soln:**

- Total students =  $15 + 10 = 25$  students in a class
- Draw = 3 students

$$\text{Probability} = \frac{\text{Favourable outcome}}{\text{Total number of outcomes}} = \frac{10C_1 \times 15C_2}{25C_3} = \frac{21}{46}$$

**Ans : A**



# Probability

- A Standard deck of playing cards consist of 52 cards, among them there are 4 subgroups/suits –
- The four suits with there names , symbols and color –

1. The suit of Hearts



13 cards

2. The suit of Diamonds



13 cards

3. The suit of Clubs



13 cards

4. The suit of Spades



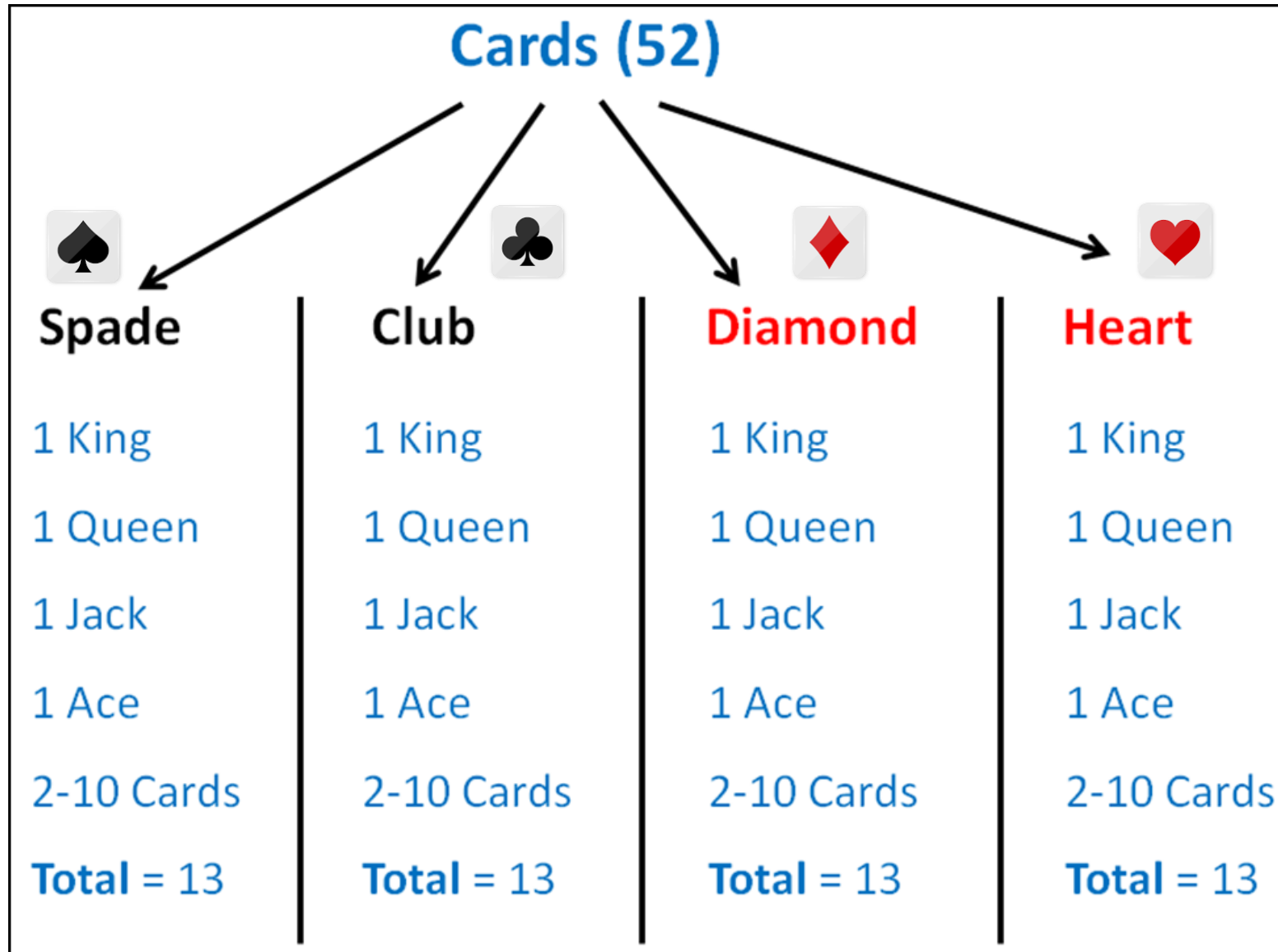
13 cards

26 red cards

26 black cards



# Probability

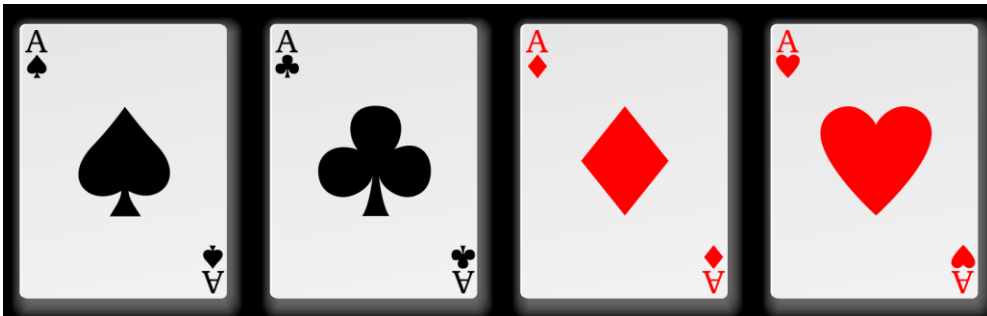


# Probability

- King, Queen and Jack (or Knaves) are **face cards**. So, there are **12 face cards** in the deck of 52 playing cards.
- **Jokers** are not normally considered to be **face cards**



- **Aces**
- There are 4 Aces in every deck, 1 of every suit.



# Probability

Q. From a pack of 52 cards, two cards are drawn together at random. What is the probability of both the cards being kings?

A. 1/15

B. 25/57

C. 35/256

D. 1/221

• **Soln-**

• **Total cards in a pack =52**

• **Total kings in a pack = 4**

• **Drawn =2**

• **Probability =  $\frac{\text{Favourable outcome}}{\text{Total number of outcomes}} = \frac{4C_2}{52C_2} = \frac{1}{221}$**

**Ans : D**



# Probability

A man tossed two dice. What is the probability that the total score is a prime number?

A.  $5/12$

B.  $5/14$

C.  $5/20$

D.  $5/24$

• **Soln-**

• **Dice = 6 faces = 6 possibilities**

• 2 Dice =  $6 \times 6 = 36$  possibilities

• Sum = prime number

• So favourable outcomes are -  $\{ (1,1), (1,2), (1,4), (1,6), (2,1), (2,3), (2,5), (3,2), (3,4), (4,1), (4,3), (5,2), (5,6), (6,5), (6,1) \}$

• Probability =  $\frac{\text{Favourable outcome}}{\text{Total number of outcomes}} = \frac{15}{36} = \frac{5}{12}$

**Ans : A**



# Probability(Assignment)

Q. A brother and sister appear for an interview against two vacant posts in an office. The probability of the brother's selection is  $\frac{1}{5}$  and that of the sister's selection is  $\frac{1}{3}$ . What is the probability that one of them is selected?

A.  $\frac{1}{5}$

B.  $\frac{2}{5}$

C.  $\frac{1}{3}$

D)  $\frac{2}{3}$

**Soln: -**

(brother is selected and sister is not selected) OR (brother is not selected and sister is selected)

$$\text{Probability} = \frac{1}{5} \times \frac{2}{3} + \frac{4}{5} \times \frac{1}{3}$$

$$= \frac{6}{15}$$

$$= \frac{2}{5}$$

**Ans: B**



# Probability(Assignment)

Q. Probability of occurrence of event a is 0.5 and that of event b is 0.2. the probability of occurrence of both a and b is 0.1. what is the probability that none of a and b occur?

A. 0.4            B. 0.5            C. 0.2            D. 0.1

**Soln:**

probability of sure event = 1

probability of occurrence of event a = 0.5

Probability of occurrence of event b = 0.2

probability of occurrence of both a and b = 0.1

probability of none =  $1 - 0.8 = 0.2$

**Ans: C**





# Probability(Assignment)

Q. A bag contains 4 white, 5 red and 6 blue balls. Three balls are drawn at random from the bag. The probability that all of them are red, is?

A.  $1/22$

B.  $3/22$

C.  $2/91$

D.  $2/77$

**Ans : C**



# Probability(Assignment)

Q. What is the probability of getting a sum 9 from two throws of a dice?

- A.  $1/6$                       B.  $1/8$                       C.  $1/9$                       D.  $1/12$

**Ans : C**



# Probability(Assignment)

Q. A bag contains 6 black and 8 white balls. One ball is drawn at random. What is the probability that the ball drawn is white?

- A.  $\frac{3}{4}$       B.  $\frac{4}{7}$       C.  $\frac{1}{8}$       D.  $\frac{3}{7}$

**Ans : B**



# Probability(Assignment)

Q. A bag contains 6 blue balls, 3 white balls and 4 green balls. If two balls are drawn at random what is the possibility that they are not of the same color?

A.  $6/13$

B.  $7/13$

C.  $9/13$

D.  $10/13$

• **Ans: C**



# Probability(Assignment)

Q. One card is drawn at random from a pack of 52 cards. What is the probability that the card drawn is a face card (Jack, Queen and King only)?

A.  $1/13$

B.  $1/4$

C.  $3/13$

D.  $9/52$

**Ans: C**



# Probability(Assignment)

Q. One card is drawn at random from a pack of 52 cards. What is the probability that the card drawn is not a face card (Jack, Queen and King only)?

A.  $5/13$

B.  $10/13$

C.  $1/13$

D.  $1/26$

**Ans: B**



