

GENERAL APTITUDE

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Mixtures & Alligation

- **Alligation** : It is the rule which enables us to find the ratio in which two or more ingredients at given prices must be mixed to produce a mixture of a desired price.(mixing / linking)
- **Mean Price** : The cost price of a unit quantity of mixture is called the mean price.
- **Dearer** : The more expensive ingredient

- Note :

Always maintain the order in which problem is given else answer gets changed



Mixtures & Alligation

Type 1 oranges at Rs.60 per kg and Type 2 oranges at Rs.120 per kg and when mixed cost is Rs.75 per kg. Find the ratio in which Type 1 and Type 2 oranges are mixed.

Soln:

Type 1
60

Type 2
120

75

$$x = d - m$$

$$y = m - c$$

$$\frac{x}{y} = \frac{d - m}{m - c} = \frac{120 - 75}{75 - 60} = \frac{45}{15} = \frac{3}{1} = 3:1$$

CP of cheaper
ingredient (c)

CP of costlier
ingredient (d)

Mean Price (m)

CP of costlier ingredient
- Mean Price

Mean Price - CP of
cheaper ingredient

$$\frac{\text{Quantity of cheaper ingredient}}{\text{Quantity of costlier ingredient}} = \frac{d - m}{m - c}$$

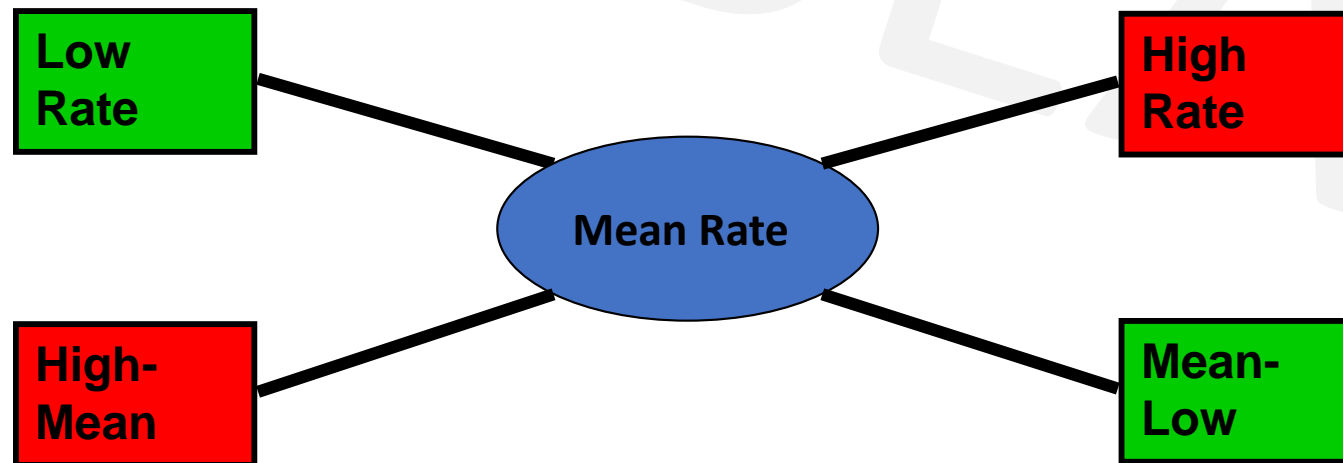


Mixtures & Alligation

$$\frac{\text{Quantity of Lower}}{\text{Quantity of Higher}} = \frac{(\text{C.P. of Higher}) - (\text{Mean Price})}{(\text{Mean Price}) - (\text{C.P. of Lower})}$$

$$\frac{Q_l}{Q_h} = \frac{CP_h - CP_m}{CP_m - CP_l}$$

$$(\text{Qty Low}) : (\text{Qty High}) = (CP_h - CP_m) : (CP_m - CP_l)$$



Mixtures & Alligation

Q. In what ratio must a grocer mix two varieties of pulses costing Rs. 15 and Rs. 20 per kg respectively so as to get a mixture worth Rs. 16.50 per kg ?

A. 3 : 7

B. 5 : 7

C. 7 : 3

D. 7 : 5

Ans: C



Mixtures & Alligation

Q. CP of rice A is Rs. 15/kg and CP of rice B is Rs.20/kg. If both A and B are mixed in the ratio 2:3. Then find the price per kg of the mixed rice.

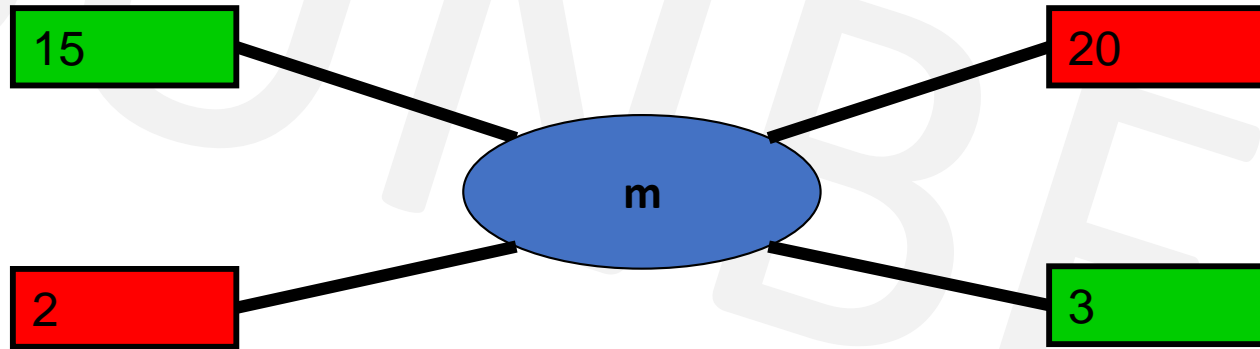
A. Rs. 28

B. Rs. 17

C. Rs. 18

D. Rs. 48

Soln:



$$\frac{x}{y} = \frac{d-m}{m-c}$$

$$\frac{2}{3} = \frac{20-m}{m-15}$$

$$m = \frac{90}{5} = \text{Rs.18}$$

Ans: C



Mixtures & Alligation

Q. In what ratio must a grocer mix two varieties of dal worth Rs. 60/kg & Rs. 65/kg, so that selling the mixture at 68.20/kg, he may gain 10%.

Soln:

- Mean price is always CP
- Steps-
 1. $m = ?$
 2. $m = \text{cost price (CP)}$
 3. SP = given
 4. find $x/y = ?$



Mixtures & Alligation

In what ratio must a grocer mix two varieties of dal worth Rs. 60/kg & Rs. 65/kg, so that selling the mixture at 68.20/kg, he may gain 10%.

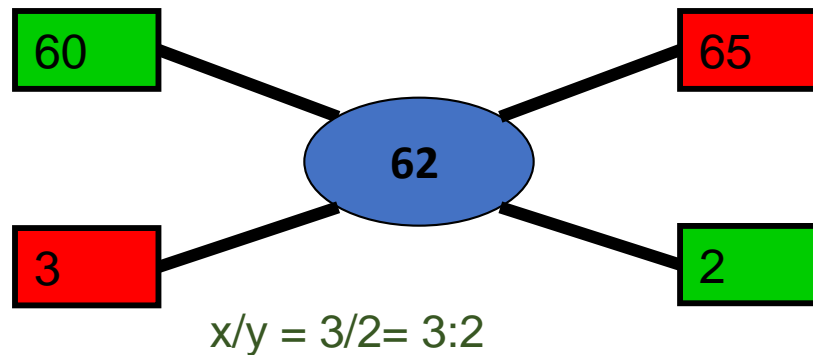
A. 3:2

B. 2:3

C. 3:4

D. 4:3

- SP of 1 kg of mixture = Rs. 68.20
- Gain = 10%
- In case of profit, $SP = \frac{C.P. \times (100 + \%gain)}{100}$
- CP of 1kg of mixture = Rs $(\frac{100}{100+10} \times 68.2)$
 $= \frac{682}{11}$
- Mean price = Rs. 62
- By the rule of alligation, we have :
- C.P. of 1kg dal of 1st kind
- C.P. of 1kg dal of 2nd kind



Ans: A

Mixtures & 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 %.

- A. 6% B. 8% C. 7% D. 9%

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

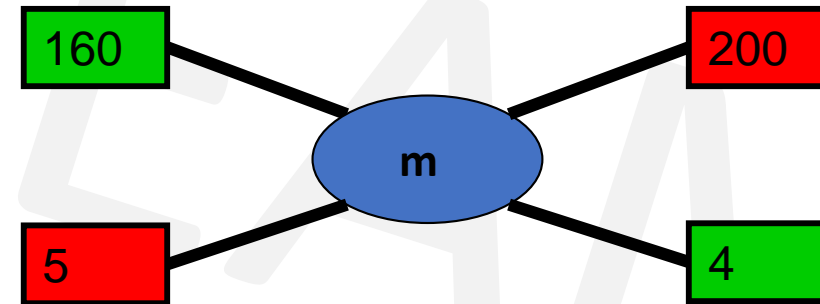
$$\text{Profit\%} = \frac{\text{SP}-\text{CP}}{\text{CP}} \times 100$$

$$= \frac{192 - \frac{1600}{9}}{\frac{1600}{9}} = \frac{1728 - 1600}{1600} = \frac{128}{16} = 8\%$$

Ans: B

cheaper price

dearer price



Mixtures & Alligation

Q. What quantity of sugar costing Rs 6.10 per kg must be mixed with 126 kg of sugar priced at Rs 2.85 per kg so that 20% may be gained by selling mix at Rs 4.80/kg ?

A. 65 kg

B. 69 kg

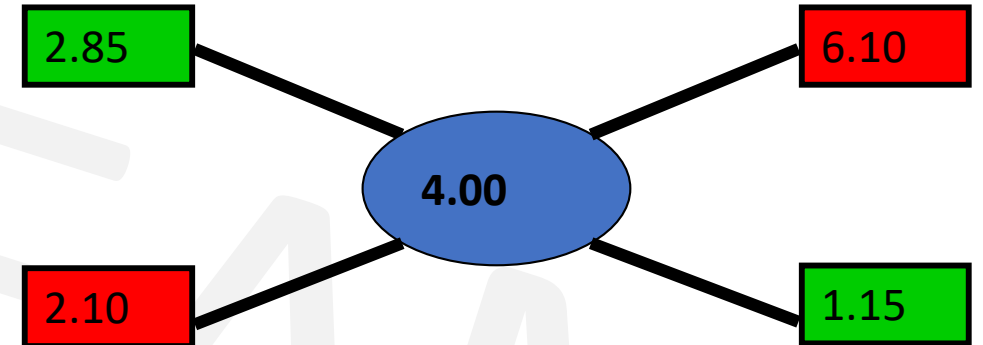
C. 66 kg

D. 64 kg

Soln :

$$SP = \frac{C.P. \times (100 + \%gain)}{100}$$

- CP (Mean) = $4.8 \times 100/120 = 4.0$
- Qty of Low : Qty of High = $210/115 = 42/23$
- $126 / Q_h = 42/23$
- $Q_l = 126 \times 23/42 = 69$
- **Ans B**



Mixtures & Alligation

Q. Acid and water are mixed in a vessel A in the ratio of 5:2 and in the vessel B in the ratio of 8:5. In what ratio mixtures from two vessels should be mixed to get a new mixture in which the acid and water will be in the ratio of 9:4?

- A. 7:2
- B. 2:7
- C. 7:4
- D. 2:3

Soln: For these type of questions consider 1 ingredient out of the two ingredients and represent as fraction of one.

A	B
a:w	a:w
5:2	8:5
C	
a:w	
9:4	

To make calculations easier, convert all denominator into common one
So, find LCM(7,13,13) = 91

A

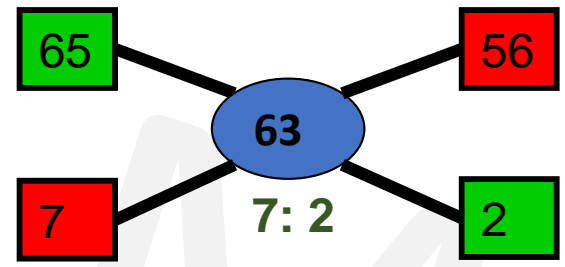
$$\frac{5}{7} \times \frac{13}{13} = \frac{65}{91}$$

B

$$\frac{8}{13} \times \frac{7}{7} = \frac{56}{91}$$

C

$$\frac{9}{13} \times \frac{7}{7} = \frac{63}{91}$$



We consider acid here, so fraction of acid,

A

$$\frac{5}{5+2} = \frac{5}{7}$$

B

$$\frac{8}{8+5} = \frac{8}{13}$$

C

$$\frac{9}{9+4} = \frac{9}{13}$$

forget denominators,
By rule of Alligation,

Ans: A

Mixtures & Alligation

- **Final concentration = Initial $(1 - \frac{R}{\text{Initial}})^n$**
- where,
- Final concentration is the amount of concentration remaining after the process
- n is the number of times the process is done and
- R is the replaced quantity.
- Initial is the initial concentration



Mixtures & Alligation

Q. A container contains 60 litres of milk. From this container 6 litres of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?

A. 38.52 litres

B. 43.74 litres

C. 42.68 litres

D. 39.85 litres

Ans: B

- The volume of milk remaining after the three processes is,

$$\begin{aligned} \bullet V &= N \left(1 - \frac{R}{N}\right)^n \\ &= 60 \left(1 - \frac{6}{60}\right)^3 \\ &= 60 \left(1 - \frac{1}{10}\right)^3 \\ &= 60(0.729) \\ &= 43.74 \text{ litres} \end{aligned}$$

where,

N is the original amount of milk,
n is the number of processes and
R is the replaced quantity.



Mixtures & Alligation(Assignment)

Q. A container contains 100 L of milk. From this container 10 L of milk was taken out and replaced by water. This process was further repeated three times. How much milk does the container have now?

A. 72.9 litres

B. 65.61 litres

C. 34.39 litres

D. 81 litres

Ans: B

Final concentration = Initial concentration $(1 - \text{Replaced}/\text{Initial})^n$



Mixtures & Alligation(Assignment)

Q. The ratio of milk to water in 80 litres of a mixture is 7 : 3. The water (in litres) to be added to it to make the ratio 2 : 1 is ?

A. 4 litres

B. 5 litres

C. 6 litres

D. 8 litres

Soln:

Mixture = 80 litres

Milk : Water
7 : 3 = 7+3 = 10 (total parts of mixture)

Quantity of Milk = $\frac{7}{10} \times 80 = 56$ litres

Quantity of Water = $\frac{3}{10} \times 80 = 24$ litres

Let quantity of water added be 'x' litres

$$\frac{56}{24+x} = \frac{2}{1}$$

$$56 = 48 + 2x$$

x = 4 litres of water is to be added.

Let, Milk = 7x and Water = 3x

$$7x + 3x = 80 \text{ litres}$$

$$10x = 80$$

$$x = 8 \text{ litres}$$

OR

$$\text{Milk} = 7x = 7 \times 8 = 56 \text{ litres}$$

$$\text{Water} = 3x = 3 \times 8 = 24 \text{ litres}$$

$$\frac{56}{24+x} = \frac{2}{1} \quad 56 = 48 + 2x$$

x = 4 litres of water is to be added.

Ans : A



Mixtures & Alligation(Assignment)

Q. How many kg of sugar costing Rs. 9 per kg must be mixed with 27kg of sugar costing Rs. 7 per kg, so that there maybe a gain of 10% by selling the mix at 9.24 per kg ?

A. 62kg

B. 63kg

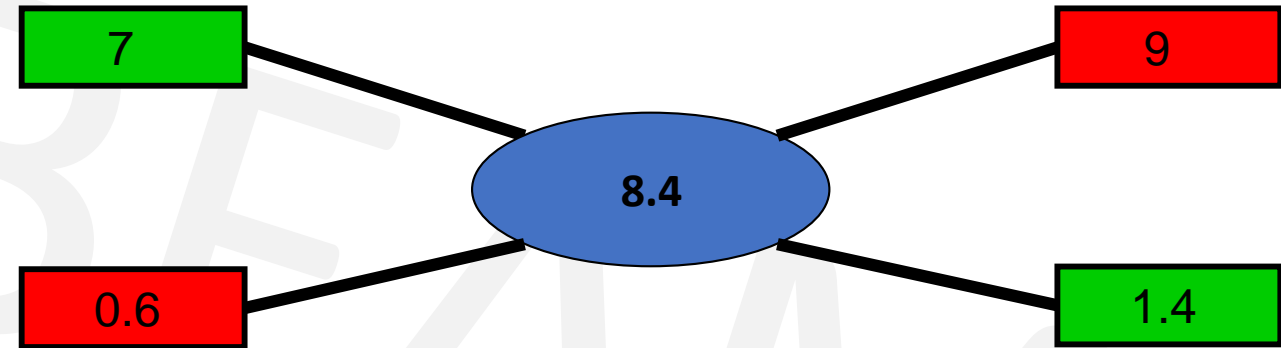
C. 53kg

D. 59kg

Soln:

$$SP = \frac{C.P. \times (100 + \%gain)}{100}$$

$$CP \text{ (Mean)} = 9.24 \times 100/110 = 8.4$$



- Qty of Low : Qty of High = $0.6/1.4 = 6/14 = 3/7$
- $27 / Q_H = 3/7$
- $Q_H = 27 \times 7/3 = 63 \text{ kg}$

Ans: B



Mixtures & Alligation(Assignment)

Q. The cost of two varieties of tea is ₹300 and ₹375 respectively. If both the varieties of tea are mixed together in the ratio 3 : 2, then what should be the price of mixed variety of tea per kg?

A. Rs. 340

B. Rs.330

C. Rs. 350

D. Rs. 360

Ans: B



Mixtures & Alligation(Assignment)

Q. What quantity of sugar costing Rs 21.20 per kg must be mixed with 144 kg of sugar priced at Rs 26.20 per kg so that 10% may be gained by selling mix at Rs 25.30/kg ?

A. 256 kg

B. 265 kg

C. 244 kg

D. 144 kg

Ans: A



Mixtures & Alligation(Assignment)

Q. What ratio must a grocer mix tea at Rs. 60/ kg and Rs. 65/kg, so that by selling the mixture at Rs. 69.30/kg, he may gain 10%

A. 2:3

B. 4:3

C. 3:2

D. 2:1

Ans: A



Mixtures & Alligation(Assignment)

Q. Find the ratio in which the contains of 2 jars A & B containing spirit & water in the ratio 1:3 & 3:2 respectively must be mixed so that resulting mixture contains 45% spirit?

A. 2:3

B. 3:5

C. 3:2

D. 3:4

Ans D



Mixtures & Alligation(Assignment)

Q. Two solutions have milk : water ratio of 2:3 and 4:5. In what ratio must they be mixed such that the resultant solution has milk : water ratio of 3:4?

A. 8:3 B. 3:8 C. 5:9 D. 9:5

Ans : C



Mixtures & Alligation(Assignment)

Q. In what ratio rice at Rs. 9.30/kg be mixed with rice at Rs. 10.80/kg. So that the mixture be worth Rs. 10/kg.

A. 6:5

B. 8:7

C. 3:7

D. 6:1

Ans : B



Mixtures & Alligation(Assignment)

Q. The ratio, in which tea costing Rs. 192 per kg is to be mixed with tea costing Rs. 150 per kg so that the mixed tea when sold for Rs. 194.40 per kg, gives a profit of 20%.

A. 2 : 5

B. 3 : 5

C. 5 : 3

D. 5 : 2

Ans : A



Mixtures & Alligation(Assignment)

Q. In what ratio must a mixture of 30% alcohol strength be mixed with that of 50% alcohol strength so as to get a mixture of 45% alcohol strength?

A. 1 : 2

B. 1 : 3

C. 2 : 1

D. 3 : 1

Ans : B



Mixtures & Alligation(Assignment)

Q. A mixture of 70 litres of alcohol and water contains 10% of water. How much water must be added to the above mixture to make the water 12.5% of the resulting mixture?

- A. 1 litre B. 1.5 litres C. 2 litres D. 2.5 litres

Ans: C

- Water=10% of 70 lit=7 lit,
- alcohol=90% of 70 lit=63 lit.
- Let, x lit water must be added.
$$\frac{(7+x)}{63} = \frac{12.5\%}{87.5\%}$$
- $7 + x = 787.5/87.5$
 $7 + x = 9$
- $x=2$ litres



Mixtures & Alligation(Assignment)

Q. In what ratio should two qualities of coffee powder having the rates of ₹47 per kg and ₹32 per kg be mixed in order to get a mixture that would have a rate of ₹37 per kg?

A. 1 : 2

B. 4 : 1

C. 1 : 3

D. 3 : 1

E. 1 : 4

Ans: A



Mixtures & Alligation(Assignment)

Q. How many kilograms of tea worth Rs. 3.60 per kg. must be mixed with 8 kg. of tea worth Rs. 4.20 per kg. so that by selling the mixture at Rs. 4.40 per kg. There may be a profit of 10%.

A) 4 kg

B) 3 kg.

C) 6 kg.

D) 8 kg.

Ans: A



Mixtures & Alligation(Assignment)

Q. The ratio of milk to water in 20 litres of a mixture is 3 :1. The Milk (in litres) to be added to the mixture so as to have milk and water in the ratio 4 : 1 is ?

A. 7 litres

B. 4 litres

C. 5 litres

D. 6 litres

Ans: C



Mixtures & Alligation(Assignment)

Q. In what ratio must water be mixed with milk costing Rs. 12 per litre to obtain a mixture worth of Rs. 8 per litre?

A. 1 : 2

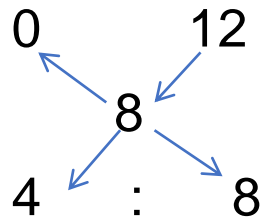
B. 2 : 1

C. 2 : 3

D. 3 : 2

Ans: A

By the rule of alligation :



Ratio of water to milk

= 4 : 8

= 1 : 2



Mixtures & Alligation(Assignment)

Q. Two jars A and B contain milk and water in the ratio 7:5 and 17:7 respectively. In what ratio mixtures from two vessels should be mixed to get a new mixture containing milk and water in the ratio 5:3?

A. 2:1

B. 1:2

C. 2:3

D. 3:4

Soln:

For these type of questions consider 1 ingredient out of the two ingredients and represent as fraction of one.

A

m:w

7:5

B

m:w

17:7

C

m:w

5:3

To make calculations easier, convert all denominator into common one

So, find $\text{LCM}(12, 24, 8) = 24$

A

$$\frac{7}{12} \times \frac{2}{2} = \frac{14}{24}$$

B

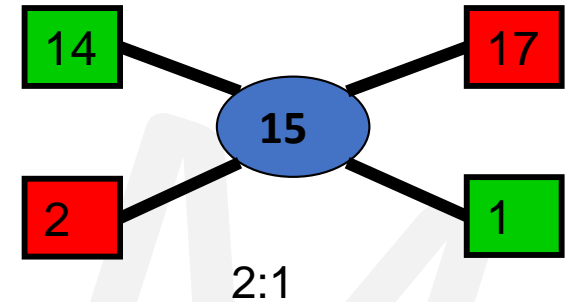
$$\frac{17}{24}$$

C

$$\frac{5}{8} \times \frac{3}{3} = \frac{15}{24}$$

forget denominators,

By rule of Alligation,



We consider milk here, so fraction of milk,

A

$$\frac{7}{7+5} = \frac{7}{12}$$

B

$$\frac{17}{17+7} = \frac{17}{24}$$

C

$$\frac{5}{5+3} = \frac{5}{8}$$

Ans: A



Mixtures & Alligation(Assignment)

Q. Two vessels A and B contain spirit and water mixed in the ratio 5:2 and 7:6 respectively. Find the ratio in which these mixtures are mixed to obtain a new mixture in vessel C containing spirit and water in the ratio 8:5?

A. 4:3

B. 3:4

C. 5:6

D. 7:9

Ans: D



Mixtures & Alligation(Assignment)

Q. A container contains 40 litres of milk. From this container 4 litres of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?

- A. 26.34 litres B. 27.36 litres C. 28 litres D. 29.16 litres

Ans: D

- The volume of milk remaining after the three processes is,

$$\begin{aligned} \bullet V &= N \left(1 - \frac{R}{N}\right)^n \\ &= 40 \left(1 - \frac{4}{40}\right)^3 \\ &= 40 \left(1 - \frac{1}{10}\right)^3 \\ &= 40(0.729) \\ &= 29.16 \end{aligned}$$

where,

N is the original amount of milk,
n is the number of processes and
R is the replaced quantity.



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 banana at the rate of 8 for Rs 34 and sold them at the rate of 12 for Rs 57
How many banana should be sold to earn a net profit of Rs. 45?

- A. 90 B. 100 C. 135 D. 150

Soln:-

<u>Cost Price</u>		<u>Selling Price</u>	
banana →	Rs	banana →	Rs
• 8 →	34	• 12 →	57
• 1 →	$\frac{34}{8} = \frac{17}{4}$	• 1 →	$\frac{57}{12} = \frac{19}{4}$

- SP > CP, so profit
- Profit = (SP – CP)
- $= \frac{19}{4} - \frac{17}{4} = \frac{1}{2}$

No. of banana to make a profit of Rs.45

$$= \frac{\text{Profit total}}{\text{Profit one}} = \frac{45}{1/2} = 90 \text{ banana}$$

Ans: A



Profit & Loss

Q. When a article is sold for Rs.116,the profit percent is thrice as much as when it is sold for Rs. 92. The cost price of article is –

A. Rs. 68

B. Rs. 72

C. Rs. 78

D. Rs. 80

Soln:

- %P when SP is 116 = 3 x %P when SP is 92
- $\frac{116-CP}{CP} \times 100 = 3 \times \frac{92-CP}{CP} \times 100$
- $116 - CP = 276 - 3CP$
- $2CP = 160$
- $CP = \text{Rs. } 80$
- **Ans: D**



Profit & Loss

Q. By selling 90 ball pens for Rs.160, a person loses 20%. How many ball pens should be sold for Rs.96, so as to have a profit of 20% ?

- A. 20 B. 30 C. 36 D. 26

Ans: C

Soln:

SP =Rs. 160 ,loss =20%

$$CP = \frac{100}{100-20} \times 160 = \text{Rs.}200$$

SP =Rs. 96 ,profit =20%

$$CP = \frac{100}{100+20} \times 96 = \text{Rs.}80$$

Rs.200 CP of = 90 ball pens

$$\text{Rs. 80 CP of} = ? \quad \frac{90 \times 80}{200} = 36 \text{ ball pens}$$



Combination

Q. A merchant has 1000 kg of sugar, part of which he sells at 8% profit and rest at 18% profit. he gains 14% on the whole. What is the quantity sold at 18% profit ?

A. 300 kg

B. 700 kg

C. 600 kg

D. 400 kg

Ans : C



Combination

Q. A man has 80 pens. He sells some of these at 15% profit and the rest at 10% loss. Overall he gets a profit of 10%. Find how many pens were sold at 15% profit ?

A. 16

B. 64

C. 40

D. 72

Ans: B



Mixtures & 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 %.

- A. 6% B. 8% C. 7% D. 9%

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

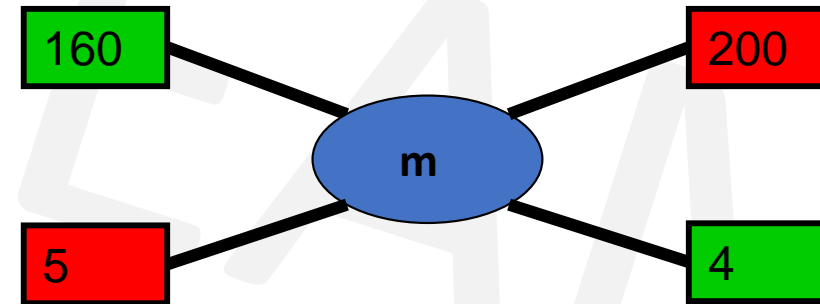
$$\text{Profit\%} = \frac{\text{SP}-\text{CP}}{\text{CP}} \times 100$$

$$= \frac{192 - \frac{1600}{9}}{\frac{1600}{9}} = \frac{1728 - 1600}{1600} = \frac{128}{16} = 8\%$$

Ans: B

cheaper price

dearer price



Profit & Loss(Assignment)

If gain is half of SP, the gain percentage is ____?

A. 50%

B. 33.33%

C. 25%

D. 100%

Soln:

we know profit = SP – CP

As per given,

$$1/2SP = SP - CP$$

$$CP = SP - 1/2SP$$

$$SP = 2CP$$

$$\text{But, Profit} = SP - CP = 2CP - CP = CP$$

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

Ans : D



Profit & Loss(Assignment)

Q. If the cost price of 6 pencils is equal to the selling price of 5 pencils, then the gain per cent is

- A. 10% B. 20% C. 15% D. 25%

Soln:

Let the cost price of one pencil be Rs.1.

CP of 5 pencils =Rs. 5

CP of 6 pencils =Rs. 6

as, SP of 5 pencils = CP of 6 pencils

SP of 5 pencils = Rs.6

if, $SP > CP$ so it's a profit

profit = $SP - CP$

= $6 - 5$

= 1

Profit % = $\text{profit}/\text{cp} \times 100$

= $1/5 \times 100$

= 20%

$SP = CP + \text{gain}$

6 times CP is equal to 5 times SP

$6CP = 5SP$

$6CP = 5(CP + \text{gain})$

$6CP = 5CP + 5\text{gain}$

$CP = 5 \text{ gain}$

Gain % = $\text{gain}/CP \times 100$

= $1/5 \times 100$

= 20%

Ans: B



Profit & Loss(Assignment)

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(Assignment)

Q. Ram bought 1600 eggs at the rate of Rs. 3.75 per dozen. He sold 900 of them at 2 eggs for Rs. 1 and the remaining at 5 eggs for Rs. 2. Find his loss or gain per cent.

A. 4%

B. 45%

C. 42%

D. 46%

Ans: D

Price of 12 eggs = Rs. 3.75

Price of 1 egg = $3.75/12 = \text{Rs.}0.3125$

Price of 1600 eggs = Rs. $(0.3125 \times 1600) = \text{Rs.}500$

CP of eggs = Rs. 500

Selling price of 2 eggs = Rs. 1

Selling price of 900 eggs =

Selling price of 5 eggs = Rs. 2

Selling price of remaining $(1600 - 900 = 700)$ eggs

Total SP of eggs = Rs. $450 + 280 = \text{Rs.}730$.

SP > CP → profit/gain

Gain = SP – CP = Rs. $730 - 500 = \text{Rs.} 230$.

%Gain = $230/500 \times 100 = 46\%$



Profit & Loss(Assignment)

Q. A shopkeeper purchases 11 sword for Rs.10 and sells them at the rate of 10 sword for Rs. 11. He earns a profit % of?

A. 11%

B. 15%

C. 20%

D. 21%

Ans: D



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. By selling 100 pencils, a shopkeeper gains the selling price of 20 pencils. His gain per cent is

A) 25

B) 20

C) 15

D) 12

Ans: A

SP – CP = gain here gain = SP of 20 pencils

S.P. of 100 pencils – C.P. of 100 pencils = S.P. of 20 pencils

S.P. of 80 pencils = C.P. of 100 pencils

Let C.P. of 1 pencil = Rs. 1

S.P. of 80 pencils = Rs. 100

C.P. of 80 pencils = Rs. 80

$$\text{Profit \%} = \frac{100-80}{80} \times 100 = 25\%$$



Profit & Loss(Assignment)

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(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



Profit & Loss(Assignment)

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



Probability

- How likely an event is supposed to happen.
- Probability = $\frac{\text{Favourable outcome}}{\text{Total number of outcomes}}$
- AND → multiply(x) e.g:- 1 green and 1 blue ball in a box
- OR → 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?

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

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 reduced)

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



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



min



max

So various probabilities to be done is 2 and 3

- **Atmost** - max to min

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



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

- 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. 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

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

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

- 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



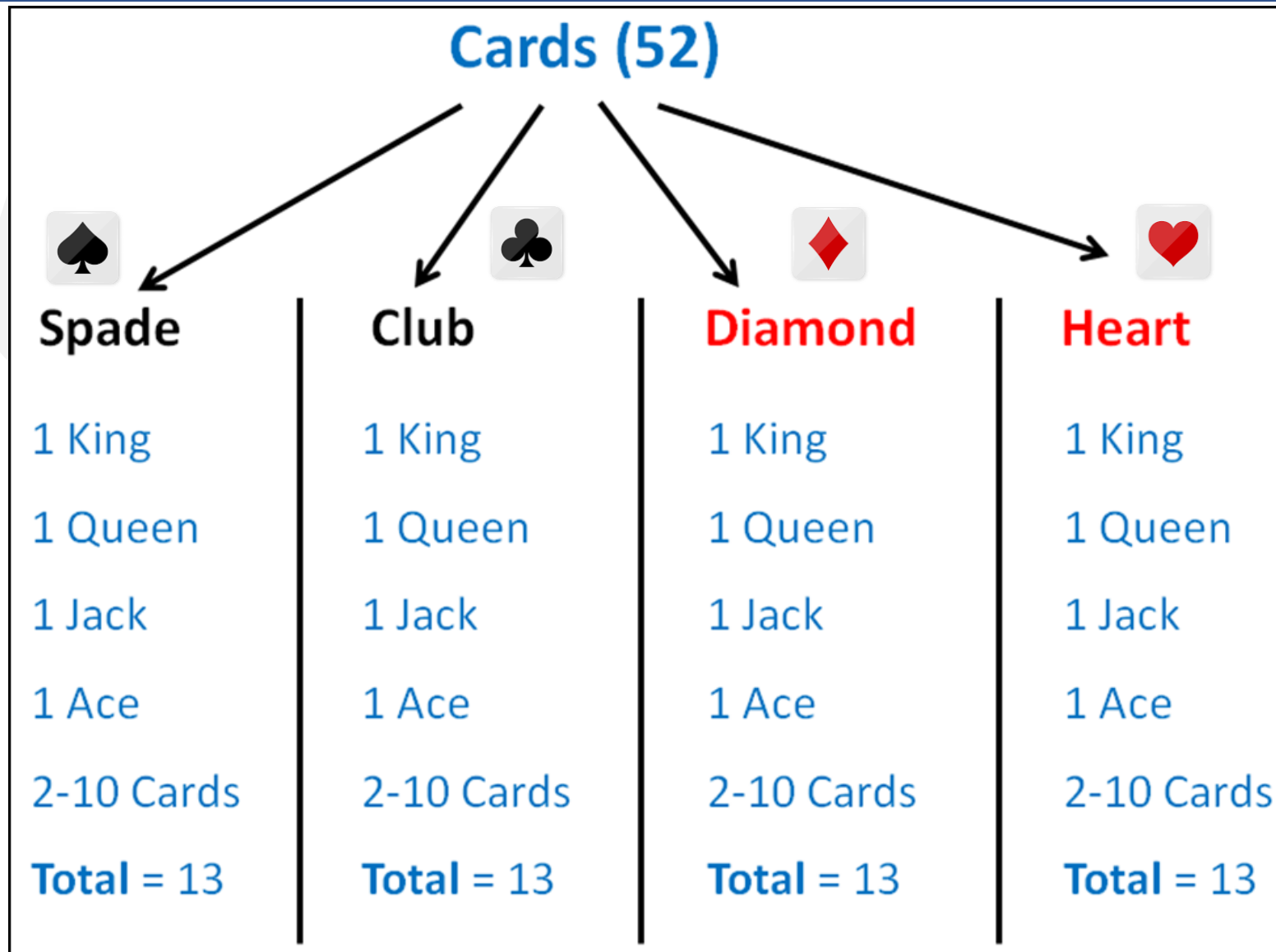
13 cards

26 red cards

26 black cards

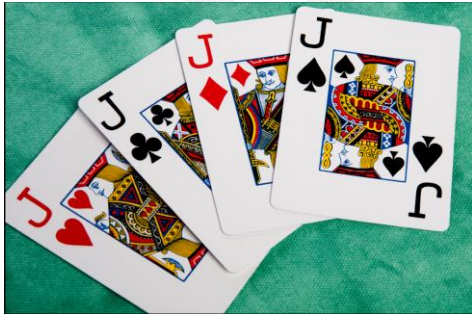


Probability

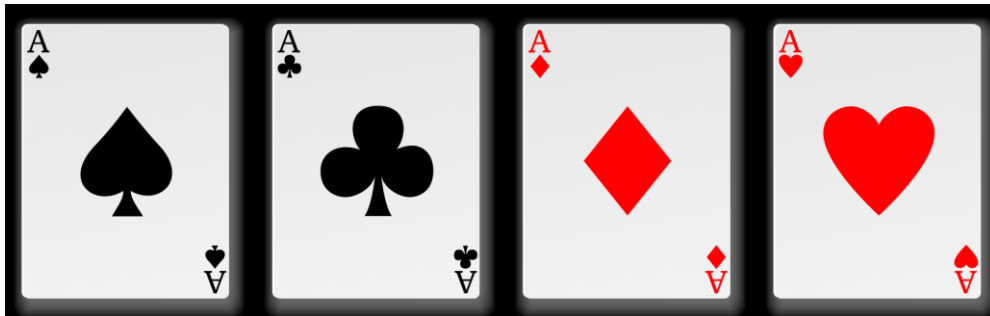


Probability

- 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

Q. Out of 450 students of a school 325 play football, 175 play cricket and 50 neither play football nor cricket. How many students play both football and cricket?

A. 50

B. 75

C. 100

D. 225

Soln:

- $A \cup B$ is used for the set that contains those elements that are either in A or in B, or in both.
- $A \cap B$ is used for the largest set which contains all the elements that are common to both the sets.
- $n(A \cap B) = n(A) + n(B) - n(A \cup B) \rightarrow$ **addition theorem of probability.**
- Total students who play either Cricket or football or both cricket and football
- $= n(A \cup B) = 450 - 50 = 400$
- students who play cricket, $n(A) = 325$ and students who play football, $n(B) = 175$
- Students who play both football and Cricket $= n(A \cap B) = 325 + 175 - 400 = 100$
- **Ans: C**



Probability(Assignment)

Q. Two dice are rolled. Find the probability of getting a sum of 8 or 11 on both the dices.

A. $5/36$

B. $9/36$

C. $7/36$

D. $11/36$

Ans: C

- Favorable outcomes for sum of 8 or 11 on both the dices are-
- $(2,6), (3,5), (4,4), (5,3), (6,2), (5,6), (6,5)$
- Number of favorable outcomes = 7
- Probability = $\frac{7}{36}$



Probability(Assignment)

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)

$$\begin{aligned}\text{Probability} &= \frac{1}{5} \times \frac{2}{3} + \frac{4}{5} \times \frac{1}{3} \\ &= \frac{6}{15}\end{aligned}$$

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

Ans: B

$$\begin{aligned}\text{sister not selected} &= 1 - \text{prob. of sister selected} \\ &= 1 - \frac{1}{3} \\ &= \frac{2}{3}\end{aligned}$$

$$\begin{aligned}\text{brother not selected} &= 1 - \text{prob. of brother selected} \\ &= 1 - \frac{1}{5} \\ &= \frac{4}{5}\end{aligned}$$



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

- Given $P(A) = 0.5$ and $P(B) = 0.2$
- $P(A \text{ or } B) = P(A \cup B) = P(A) + P(B) - P(A \cap B)$
 $= 0.5 + 0.2 - 0.1 = 0.6$
- And $P(\text{neither A nor B}) = P(A' \cap B') = 1 - P(A \cup B) = 1 - 0.6 = 0.4.$

Ans: A

- Note: $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
- This is also known as the addition theorem of probability.



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. 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(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



Probability(Assignment)

Q. A basket contains 6 apples ,4 pears and 3 oranges. If two fruits are picked up at random, what is the probability that both are pears?

A. $4/13$

B. $1/13$

C. $2/13$

D. $3/26$

Ans: B



Partnership

Q.A started business with Rs. 45,000 and B joined afterwards with 30,000. If the profit at the end of a year was divided in the ratio 2 : 1 respectively, then B would have joined A for business after.

A. 1 month

B. 2 months

C. 3 months

D. 4 months

Soln:

- Capital of A = Rs. 45,000 Capital of B = Rs. 30,000
- Ratio of P1:P2=2:1
- using formula,
- $\frac{C_1T_1}{C_2T_2} = \frac{P_1}{P_2}$
- In this type , the time period is 12 months i.e. one year
- $\frac{45000 \times 12}{30000 \times T_2} = \frac{2}{1}$
- $T_2=9$
- B would join business after $(12 - 9) = 3$ months
- **Ans: C**



Partnership

Q. If 4 (A's capital) = 6 (B's capital) = 10 (C's capital), then out of a profit of Rs. 4650, C will receive _____

A) Rs.700

B) Rs.800

C) Rs.900

D) Rs.1000

Soln:

$$4A = 6B = 10C$$

$$A = 10/4C = 5/2C \quad \text{and} \quad B = 10/6C = 5/3C$$

$$A + B + C = 4650$$

$$5/2C + 5/3C + C = 4650$$

$$C = 900$$

Share of C or C will receive Rs.900

Ans: C



Partnership

Q. A, B & C enter into a partnership with total of Rs 8,200. A's capital is Rs 1000 more than B's & Rs 2000 less than C's. What is B's share of annual profit of Rs 2,460?

A. Rs 1320

B. Rs 720

C. Rs 420

D. Rs 520

Ans: C



Partnership(Assignment)

Q. A started a business by investing Rs. 32000. After 4 months B joined him with some investments. At the end of the year the total profit was divided in the ratio 6:5. How much capital was invested by B?

A. Rs. 30,000

B. Rs. 28000

C. Rs. 40000

D. Rs. 19000

Ans: C



Partnership(Assignment)

Q. Three persons started a placement business with a capital of Rs. 3000. B invests Rs. 600 less than A and C invests Rs. 300 less than B. What is B's share in a profit of Rs. 886 ?

- A. Rs. 443
- B. Rs. 354.40
- C. Rs. 265.80
- D. Rs. 177.20

Ans: C



Partnership(Assignment)

Q. Anand and Deepak started a business investing Rs.22,500 and Rs.35,000 respectively. Out of a total profit of Rs. 13,800. Deepak's share is

A. Rs 9600

B. Rs 8500

C. Rs 8450

D. Rs 8400

Ans: D

Ratio of their shares-

= 22500 : 35000

= 9 : 14

Deepak's share = Rs.(13800×14/23)

= Rs. 8400



Partnership(Assignment)

Q. A started a business with Rs. 21,000 and is joined afterwards by B with Rs. 36,000. After how many months did B join if the profits at the end of the year are divided equally?

A. 4

B. 5

C. 6

D. 7

Ans: B

- Capital of A = Rs. 21000
- Capital of B = Rs. 36000
- Ratio of P1:P2=1:1
- using formula,
- $\frac{C_1 T_1}{C_2 T_2} = \frac{P_1}{P_2}$
- In this type , the time period is 12 months i.e. one year
- $\frac{21000 \times 12}{36000 \times T_2} = \frac{1}{1}$
- $T_2 = 7$
- B would join business after $(12 - 7) = 5$ months



Partnership(Assignment)

Q. A,B,C subscribes Rs. 50000 for a buisness. A subscribes Rs. 4000 more than B and B Rs. 5000 more than C. Out of a total profit of Rs. 35000, A receives :

- A. Rs. 8400
- B. Rs. 11900
- C. Rs. 13600
- D. Rs. 14700

Ans: D



Partnership(Assignment)

- Three partners A , B , C start a business . B's Capital is four times C's capital and twice A's capital is equal to thrice B's capital. If the total profit is Rs 16500 at the end of a year ,Find out B's share in it.
 - A. Rs. 4000 B. Rs. 5000 C. Rs. 6000 D. Rs. 7000
 - **Ans: C**
 - $A : B = 3 : 2$
 - $B : C = 4 : 1$
 - $A:B:C = 12:8:2$ (using inverted N)
 - $A:B:C = 6:4:1$
- Share of B = $16500 \times \frac{4}{11} = 6000/-$



