RATIOS, MIXTURES AND PARTNERSHIP

DRILL – 1 – BRIDGE THREE COMPONENT

Given		Find Out
A:B = 4:5	B:C = 6:7	A:C =
A:B = 6:7	B:C = 8:9	A:B:C =
BC:AC:AB = 1:2:3		A:B:C =
1/A : 1/B : 1/C = 2:3:5		A:B:C =

DRILL – 2 – BRIDGE FOUR COMPONENT

- Given: A: B = 2:5 B: C = 3:1 C: D = 3:5; Find A: B: C: D
- Find B's share in Rs. 6300 if A:B = 2:3, B:C = 4:5, C:D = 3:7
- Find A:D if A:B = 2:5, B:C = 4:3, C:D = 1:7

DRILL – 3 – PROPORTIONAL

Third proportional = b^2/a ⟹ Find the third proportion to 16 and 24

Fourth proportional = b x c / a ⟹ Fourth proportion to 16,4 and 4

Mean proportion = √(a x b) ⟹ Mean proportion of 0.32 and 0.02

DRILL – 4 – ACTUALS AND ASSUMPTIONS

- The scores of P and Q in a test are in the ratio of 5:4. If their total score is 135, find P's score?
  a. 45 b. 54 c. 63 d. 75
- A sum of money is to be distributed among A, B, C, D in the proportion of 5 : 2 : 4 : 3. If C gets Rs. 1000 more than D, what is B's share?
  a. 1000 b. 2000 c. 3000 d. NOTA
- Two number are in the ratio 3 : 5. If 9 is subtracted from each, the new numbers are in the ratio 12 : 23. The smaller number is:

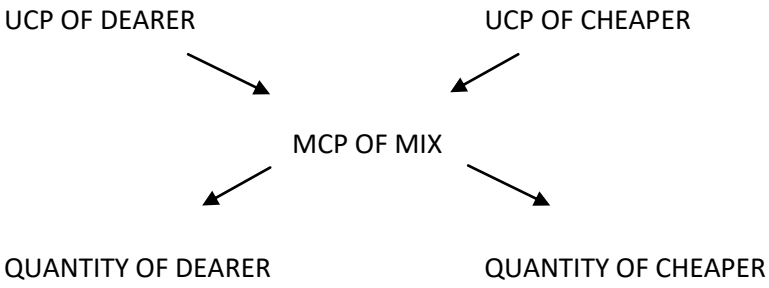
a. 27 b. 30 c. 33 d. 36

- Seats for Mathematics, Physics and Biology in a school are in the ratio 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?
  a. 1:2:3 b. 2:3:4 c. 3:4:5 d. 4:5:6

- Salaries of Ravi and Sumit are in the ratio 2 : 3. If the salary of each is increased by Rs. 4000, the new ratio becomes 42 : 57. What is Sumit's increased salary?
  a. 19000 b. 19500 c. 20000 d. 20500

DRILL – 5 – ALLIGATIONS

Alligation rule:



- 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. 1:2 b. 2:3 c. 1:6 d. 7:3
- In what ratio must water be mixed with milk to gain $16\frac{2}{3}$% on selling the mixture at cost price?
  a. 1:2 b. 2:3 c. 1:6 d. 7:3

- In what ratio must water be mixed with milk costing Rs. 12/ litre to obtain a mixture worth of Rs. 8/ litre?
  a. 1:2 b. 2:3 c. 1:6 d. 7:3

- Find the ratio in which rice at Rs. 7.20 a kg be mixed with rice at Rs. 5.70 a kg to produce a mixture worth Rs. 6.30 a kg.
  a. 1:2 b. 2:3 c. 1:6 d. 7:3

- Tea worth Rs. 126 per kg and Rs. 135 per kg are mixed with a third variety in the ratio 1 : 1 : 2. If the mixture is worth Rs. 153 per kg, the price of the third variety per kg will be:
  a. 170.25 b. 171.50 c. 175 d. NOTA

DRILL 6 – ALLIGATIONS Vs PROFIT

- In what ratio must a grocer mix two varieties of tea worth Rs. 60 a kg and Rs. 65 a kg so that by selling the mixture at Rs. 68.20 a kg he may gain 10%?
  a. 5:4 b. 4:3 c. 3:2 d. NOTA

- How much salt(in kg) worth 42 P / kg must one mix with25 kg of salt worth 24 P / kg so that he may, on selling the mixture at 40 P / kg, gain 25% on the outlay.
  a. 18 b. 20 c. 22 d. 24

- How many kilogram of sugar costing Rs. 9 per kg must be mixed with 27 kg of sugar costing Rs. 7 per kg so that there may be a gain of 10% by selling the mixture at Rs. 9.24 per kg?
  a. 45 b. 54 c. 27 d. 63

- A merchant has 1000 kg of sugar, part of which he sells at 8% profit and the rest at 18% profit. He gains 14% on the whole. The quantity sold at 18% profit is:
  a. 600 b. 575 c. 550 d. NOTA

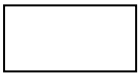
DRILL 7 – REMOVAL AND REPLACEMENT

Let the mixture contain A and B, Amount of mixture = M. Now, 'x' unit of mixture is taken out and replaced with any one ingredient, say B. This is repeated 'n' times.

Now

$$\frac{\text{Amount of A left out}}{\text{Amount of A originally present}} = [1 - (x/M)]^n$$

- From a cask of milk containing 15 litres, 2 litres are drawn out and the cask is filled up with water. If the same process is repeated for five times what will be the no. of litres of milk left in the cask?



- Eight litres are drawn from a cask full of wine and is then filled with water. This operation is performed 3 more times. The ratio of the quantity of wine now left in cask to that of the water is 16:81. How much wine did the cask hold originally.
  a. 20 b. 22 c. 24 d. 26

- 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. 29.16 b. 30.35 c. 28.75 d. 31.6

DRILL 8 – PARTNERSHIP

- Investment ratio = Profit ratio
- Suppose A and B invest Rs. *x* & Rs. *y* respectively for a year in a business, then at the end of the year:
  (A's share of profit): (B's share of profit) = *x*: *y*.
- Suppose A invests Rs. x for p months and B invests Rs. y for q months then,
  (A's share of profit) : (B's share of profit)= xp : yq.

➢ A,B and C enter into a partnership. A contributes one third of the capital while B contributes as much as A and C together contributed. If the profits at the year amounted to Rs. 840, what would each receive?

➢ A and B invest in a business in the ratio 3 : 2. If 5% of the total profit goes to charity and A's share is Rs. 855, the total profit is:
a. 1000 b. 1200 c. 1500 d. 1800

➢ A, B and C jointly thought of engaging themselves in a business venture. It was agreed that A would invest Rs. 6500 for 6 months, B, Rs. 8400 for 5 months and C, Rs. 10,000 for 3 months. A wants to be the working member for which, he was to receive 5% of the profits. The profit earned was Rs. 7400. Calculate the share of B in the profit.
a. 2570 b. 2660 c. 2780 d. NOTA

GOOGLY QUESTIONS

1. 2A=3B=4C then A: B: C?
Solution:
Since, 2A = 3B = 4C, A:B:C = 2:3:4

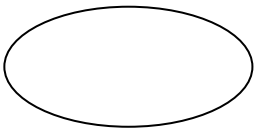
2. A sum of Rs 1162 is divided among A, B and C, such that 4 times A's share is equal to 5 times B's share and 7 times C's share. What is the share of C?
Solution:
4A = 5B = 7C
A:B:C = 35:28:20
C's share = (20 / 83) x 1162 = 280

3. The sum of squares of 3 numbers is 532. And their ratio of the first to the second as also of the second to the third is 3:2. What is the second number?
Solution:
A:B = 3:2
B:C = 3:2
A:B:C = 9:6:4

Since sum of the squares of A,B and C is 532
81x+36x+16x = 532 => 133x = 532
X = 4, therefore the second number is 6x = 24.

4. The ratio of milk and water –milk mixture is 2:3. How much water should be added to 60 litres of the mixture to make the ratio of milk and mixture as 1:3?
Solution:

$$\frac{\text{Quantity of milk}}{\text{Quantity of mixture}} = 2/3$$



Now, x litres of water is added to 60 litres of mixture to obtain the new ratio as 1:3.

$$\frac{\text{Quantity of milk}}{\text{Quantity of mixture}} = \frac{2/5 \text{ X } (60 + x)}{60}$$

X = 45 litres

PRACTICE PROBLEMS

1. A and B together have Rs. 1210. If $\frac{4}{15}$ of A's amount is equal to $\frac{2}{5}$ of B's amount, how much amount does B have?
a. 460 b. 484 c. 550 d. 664

2. The ratio of the number of boys and girls in a college is 7 : 8. If the percentage increase in the number of boys and girls be 20% and 10% respectively, what will be the new ratio?
a. 8:9 b. 17:18 c. 21:22 d. CBD

3. The sum of three numbers is 98. If the ratio of the first to second is 2 :3 and that of the second to the third is 5 : 8, then the second number is:
a. 20 b. 30 c. 48 d. 58

4. If Rs. 782 be divided into three parts, proportional to $\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$, then the first part is:
a. 182 b. 190 c. 196 d. 204

5. In a bag, there are coins of 25 p, 10 p and 5 p in the ratio of 1 : 2 : 3. If there is Rs. 30 in all, how many 5 p coins are there?
a. 50 b. 100 c. 150 d. 200

6. The ratio of the number of marbles with R and S is 19:13. If R gives S, 30 marbles, both will have equal number of marbles. Find the number of marbles with R?
a. 170 b. 150 c. 190 d. 180

7. R and S are partners sharing profits & losses in the ratio of 2:1. They admit T into partnership giving him 1/5th share in profits which he acquires from R & S in the ratio of 1:2. Calculate the new profit sharing ratio.
   a. 1:2:1 b. 3:1:1 c. CBD d. NOT

8. The ratio of the monthly incomes of A and B is 3:4. The ratio of their monthly expenditures is 4:5. Find the ratio of their monthly savings, if the savings of A is 1/4th of his income.
   a. 13:16 b.15:13 c. 12:19 d. 12:13

9. A man divides his property so that ratio of his son's share to his wife's and the ratio of the wife's share to his daughter are both 3:1. If the daughter gets Rs. 10000 less than the son, then the total worth of his property is:
   a. 15000 b. 15750 c. 16000 d. 16250

10. A, B and C enter into a partnership in the ratio $\frac{7}{2} : \frac{4}{3} : \frac{6}{5}$. After 4 months, A increases his share 50%. If the total profit at the end of one year be Rs. 21,600, then B's share in the profit is:
    a. Rs. 2100 b. Rs. 2400 c. Rs. 3600 d. Rs. 4000

11. A, B, C subscribe Rs. 50,000 for a business. A subscribes Rs. 4000 more than B and B Rs. 5000 more than C. Out of a total profit of Rs. 35,000, A receives:
    a. Rs. 8400 b. Rs. 11900 c. Rs. 13600 d. Rs. 14700

12. A starts business with Rs. 3500 and after 5 months, B joins with A as his partner. After a year, the profit is divided in the ratio 2 : 3. What is B's contribution in the capital?
    a. Rs. 7500 b. Rs. 8000 c. Rs. 8500 d. Rs. 9000

13. A, B, C rent a pasture. A puts 10 oxen for 7 months, B puts 12 oxen for 5 months and C puts 15 oxen for 3 months for grazing. If the rent of the pasture is Rs. 175, how much must C pay as his share of rent?
    a. Rs. 45 b. Rs. 50 c. Rs. 55 d. Rs. 60

14. A and B started a business in partnership investing Rs. 20,000 and Rs. 15,000 respectively. After six months, C joined them with Rs. 20,000. What will be B's share in total profit of Rs. 25,000 earned at the end of 2 years from the starting of the business?
    a. Rs. 7500 b. Rs. 9000 c. Rs. 9500 d. Rs. 10000

15. The ratio of milk and water in a mixture of 35 litres is 4:1. How much water must be added to the mixture so that the ratio of milk and water be 3:2.
    a. 15 3/5 b. 11 2/3 c. 162/5 d. NOTA