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RATIO & PROPORTION

Introduction

Ratio is a quantity that expresses the relationship between two similar quantities. It expresses a magnitude by which one quantity is a part of or a multiple of another quantity.

If the value of A and B are 8 and 6, respectively, then they are in the ratio 8:6 (read as 8 is to 6). Ratio can be understood also as the relationship which one quantity bears with the other of the same kind. Due to this reason, we cannot compare salary of one person with the percentage expenditure of another person.

The ratio of two quantities A and B is written as A:B. Here, A is known as an antecedent and B is known as a consequent. It can also be said that $A:B = kA:kB$, where k is any constant known as constant of proportionality, $k \neq 0$.

If the antecedent is more than the consequent (or, the numerator is more than the denominator), then the ratio is known as an improper ratio.

For **example**, $5/3$, $55/29$, etc.

If the antecedent is less than the consequent (or, the numerator is less than the denominator), then the ratio is known as a proper ratio.

For **example**, $3/7$, $7/18$, etc.

Since ratio compares two similar quantities, it cannot have any units.

Example 1 Consider any ratio $\frac{a}{b}$. Now, x is added to the numerator and the denominator of this fraction. Which of the following is greater: $\frac{a+x}{b+x}$ or $\frac{a}{b}$?

Solution It depends upon the following two factors:

- If the ratio is proper or improper.
- x is positive or negative.

If $\frac{a}{b} > 1$ and $x > 0$, or, $\frac{a}{b} < 1$ and $x < 0$

$$\frac{a}{b} > \frac{a+x}{b+x}$$

and if $\frac{a}{b} > 1$ and $x < 0$, or, $\frac{a}{b} < 1$ and $x > 0$

$$\frac{a}{b} < \frac{a+x}{b+x}$$

RATIO

Ratio can be understood in the following two ways:

- Ratio as a bridging element
- Ratio as a multiplier

Ratio as a Bridging Element

Ratio as a bridging element helps us in establishing the relationship between more than two quantities. This can be further understood with the following **example**:

Suppose conversion rate of our currency Rupee is given with respect to US dollar and also with respect to Pound sterling. If we have to find the conversion ratio of US dollar with respect to pound sterling, we can do it by making rupee as the bridge between US dollar and pound sterling.

Example 2 The ratio of the age of A and B is 2:5 and ratio of the age of B and C is 3:4. What is the ratio of the age of A, B, and C?

Solution Since B is the common platform that associates A and C, so we will try to make B equal in both the cases.

$$\text{Age of A : Age of B} = [2:5] \times 3$$

$$\text{Age of B : Age of C} = [3:4] \times 5$$

$$\text{Or, Age of A : Age of B} = 6:15 \text{ (i)}$$

$$\text{Age of B : Age of C} = 15:20 \text{ (ii)}$$

Since ratio of B is same in both the cases, hence, age of A:Age of B:Age of C = 6:15:20.

Example 3 Given that

$$\text{Salary of A:Salary of B} = 1:2$$

$$\text{Salary of B : Salary of C} = 3 : 4$$

$$\text{Salary of C : Salary of D} = 5 : 6$$

$$\text{Salary of D : Salary of E} = 7 : 8$$

$$\text{Salary of E : Salary of F} = 9 : 10$$

What is the ratio of the salaries of A, B, C, D, E, and F?

Solution Salary of A : Salary of B : Salary of C : Salary of D : Salary of E : Salary of F = $(1 \times 3 \times 5 \times 7 \times 9) : (2 \times 3 \times 5 \times 7 \times 9) : (2 \times 4 \times 5 \times 7 \times 9) : (2 \times 4 \times 6 \times 7 \times 9) : (2 \times 4 \times 6 \times 8 \times 9) : (2 \times 4 \times 6 \times 8 \times 10)$

(Understand the above mechanism with the help of the method given in **Example 2**. In these cases, this method can be used as a shortcut to find the ratios in the following way : For A, take all the leftmost digits, and now keep shifting towards the right digits by quitting one by one all the leftmost digits. So, B = Right digit of 1st ratio and so on for C, D, E, and F.)

Example 4 If $A:B = 3:4$,

$$B:C = 5:7$$

$$C:D = 10:11$$

What is the ratio of A:D?

Solution $A = 3 \times 5 \times 10$ and $D = 4 \times 7 \times 11$

So, the ratio = 150:308

$$\text{Alternatively, } (A/B) \times (B/C) \times (C/D) = (3/4) \times (5/7) \times (10/11) = (3 \times 5 \times 10)/(4 \times 7 \times 11) = 150:308$$

Example 5 A, B, C, and D purchase a gift worth Rs.60. A pays $1/2$ of what others are paying, B pays $1/3$ rd of what others are paying and C pays $1/4$ th of what others are paying. What is the amount paid by D?

Solution Since A is paying $1/2$ of what others are paying, so A is paying $1/3$ rd of the total amount.

(To understand this, let us assume that B, C, and D are paying Rs. $2x$. So, A is paying Rs. x . The total amount being paid by A, B, C, and D = $3x = \text{Rs.}60$, hence, the amount paid by A = $x/3x = 1/3$ rd of the total.)

So, the amount paid by A = $60/3 = \text{Rs.}20$

Similarly, B is paying $1/4$ th of the total and C is paying $1/5$ th of the total.

Hence, the amount paid by B and C are Rs.15 and Rs.12, respectively.

So, the amount paid by D = Rs.13

Ratio as a Multiplier

The moment we say that the ratio of two numbers A and B is 5:1, what we mean to say that A is 5 times of B.

It can also be seen that A:B:C in $A/2:B/3:C/4 = K$ is not same as A:B:C = $1/2:1/3:1/4$ since multiplier of A, B, and C are not the same in both the cases.

Ratio of A:B:C in $A/2:B/3:C/4 = K$ can be calculated in the following way:

Since $A/2 = B/3 = C/4 = K$, so $A = 2K$, $B = 3K$, and $C = 4K$

Hence, the ratio of A:B:C = 2:3:4

While calculating the ratio of A, B, and C in A:B:C =

$1/2:1/3:1/4$, we will multiply each of A, B, and C by the LCM of the denominator of all the ratios, that is, 12.

So, A:B:C = 6:4:3

Example 6 Ten persons can cut 8 trees in 12 days. How many days will 8 persons take to cut 6 trees?

Solution Let us see this question in a changed perspective.

Suppose if the question is—10 persons can cut 8 trees in 12 days. How many days will 10 persons take to cut 4 trees?

Answer to this question is: Since the amount of work is getting halved, so the number of days will also get halved. There are three factors, namely the number of men, the number of days and the number of trees, which are responsible for the final answer.

Since the number of men are less in the final situation, so more number of days will be required. Hence, multiplier = $10/8$ (had there been 12 persons, multiplier would have been $10/12$).

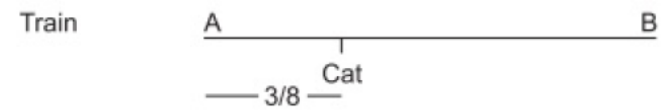
The number of trees are less in the final situation, so less number days will be required. So, multiplier = $6/8$

Hence, the total number of days = $12 \times 10/8 \times 6/8 = 90/8 = 11.25$ days

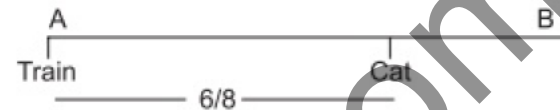
Example 7 A train approaches a tunnel AB. Inside the tunnel, a cat is sitting at a point that is $3/8$ th of the distance of AB measured from the entrance A. When the train whistles, the cat runs. If the cat moves to the entrance of the tunnel A, the train catches the cat exactly at the entrance. If the cat moves to the exit B, the train catches

the cat exactly at the exit. What is the ratio of the speed of the train and the speed of the cat?

Solution



Initially, this was the position of the train and the cat. Now, let us assume that the cat is moving towards exit B. The moment the cat covers $3/8$ th of AB distance in the direction of exit B, the train will be at the entrance A.



Now, if the cat moves in the direction of exit B, the train is catching up with the cat at the exit B. So, in the time cat covers $2/8$ th distance, the train is covering the whole distance from A to B.

So, the ratio of the distance covered by train and the distance covered by the cat = 4:1

So, the ratio of speed = 4:1

Example 8 Pranesh can do a work in 15 days. In how many days, will the work be completed by his brother Saket if efficiency of Saket is 60% more than that of Pranesh?

Solution Since the ratio of efficiency of Pranesh and Saket = $100:160 = 5:8$, the number of days taken by Pranesh and Saket will be in the ratio of 8:5.

Since Pranesh takes 15 days to do this work, Saket will take $15 \times 5/8 = 9.37$ days

Comparison of Ratio

This is one of the most important calculations and is extensively used in DI. On an average, if somebody does 100 calculations in DI at least 8 to 10 calculations will be from comparing the ratios. Normally, there are two methods to compare two or more than two ratios:

Cross Multiplication Method

Example Let us compare $\frac{11}{15}$ and $\frac{13}{18}$.

$$\frac{11}{15} \quad \frac{13}{18}$$



Cross multiplying numerator of first fraction with the denominator of second fraction and denominator of first fraction with the numerator of second fraction,

$$11 \times 18 \quad 13 \times 15$$

$$198 \quad 195$$

Since, 198 is greater than 195 the first fraction ($\frac{11}{15}$) is greater than the second fraction ($\frac{13}{18}$).

Decimal Calculation

$$\left(\frac{11}{15}\right) = 0.733\left(\frac{13}{18}\right) = 0.722$$

Obviously, here the first fraction $\left(\frac{11}{15}\right)$ is greater than the second fraction $\left(\frac{13}{18}\right)$.

However, if we have to compare $\frac{3156}{5435}$ and $\frac{3423}{5822}$, then using any of the above two methods becomes cumbersome and time-consuming.

Here, we will compare ratios with the help of percentage.

PROPORTION

In case of an analogy, two quantities share same kind of relationship. For **example**, what Macbeth is to William Shakespeare, Dr Zivago is to Boris Pasternak.

In QA, the same is true for proportion. It is basically the equality of the two ratios.

$$\frac{A}{B} = \frac{C}{D}$$

When A, B, C, and D are in proportion, then A and D are known as 'extremes', and B and C are known as 'means'. Therefore, we can say,

Product of extremes = Product of means

Example 9 What is the value of x in the following expression?

$$\frac{5}{8} = \frac{x}{12}$$

Solution $\frac{5}{8} = \frac{x}{12}$

$$\Rightarrow x = \frac{60}{8} = 7.5$$

It can be calculated with the help of percentages also. In this question, the percentage increase in the denominator is 50%, so the numerator will also increase by 50%.

Standard Results/Definitions on Ratio/Proportion

1. Continued proportion

a, b, and c are said to be in continued proportion

$$\text{if } \frac{a}{b} = \frac{b}{c}$$

So, $b^2 = ac$. Here, b is known as the mean proportion. Similarly, if a, b, c, and d are in continued proportion, then we get:

$$\frac{a}{b} = \frac{b}{c} = \frac{c}{d}$$

2. Componendo

$$\text{If } \frac{a}{b} = \frac{c}{d}, \text{ then } \frac{a+b}{b} = \frac{c+d}{d}$$

3. Dividendo

4.

$$\text{If } \frac{a}{b} = \frac{c}{d}, \text{ then } \frac{a-b}{b} = \frac{c-d}{d}$$

4. Componendo and Dividendo

$$\text{If } \frac{a}{b} = \frac{c}{d}, \text{ then } \frac{a+b}{a-b} = \frac{c+d}{c-d}$$

5. Invertendo

$$\text{If } \frac{a}{b} = \frac{c}{d}, \text{ then } \frac{b}{a} = \frac{d}{c}$$

6. Alterando

$$\text{If } \frac{a}{b} = \frac{c}{d}, \text{ then } \frac{a}{c} = \frac{b}{d}$$

$$7. \frac{a}{b} = \frac{c}{d} = \frac{a+c}{b+d}$$

In general, if $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \dots = K$

$$\text{Then, } \frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \dots = K = \frac{a+c+e+\dots}{a+d+f+\dots}$$

= (any combination of the numerator/any combination of the corresponding denominator)

$$\text{For example, } 1/2 = 3/6 = 4/8 = \dots = (1+3+4)/(2+6+8) = (3+4)/(6+8)$$

8. If we multiply the numerator and the denominator of a ratio by any number N ($N \neq 0$), then the ratio remains same. $A/B = NA/NB$
9. If we divide the numerator and the denominator of a ratio by any number N ($N \neq 0$), then the ratio remains same. $A/B = (A/N)/(B/N)$
10. If $a/b, c/d, e/f \dots$ etc., are all unequal ratios, then the value of $(a+c+e+\dots)/(b+d+f+\dots)$ lies in between the minimum and the maximum of all these ratios.

APPLICATION OF RATIO, PROPORTION, AND VARIATION

Income-Expense Ratio

When the ratio of incomes and expenses of two persons are given and their savings is being asked.

Example 12 The ratio of the incomes of Mr Vinay Singh and Mr Arun Sharma is 3:5 and the ratio of their expenses is 1:3. Who is saving more?

Solution Let us assume the values of income and expenses of A and B.

	Income	Expense	Savings
Vinay	3	1.5	1.5
Arun	5	4.5	0.5

So, Vinay saves more than Arun.
In the other case,

	Income	Expense	Savings
Vinay	3	1	2
Arun	5	3	2

So, savings of both of them is equal.

	Income	Expense	Savings
Vinay	3000	1600	1400
Arun	5000	4800	200

So, in this case, Mr Singh is saving less than Mr Sharma. Therefore, it is difficult to determine who is saving more. The concept tells us: If the value of the ratio of income is more than the value of the ratio of expenses, then we cannot determine who is saving more. If the value of the ratio of expenses is more than the value of the ratio of income, then we can determine who is saving more. (Ratio should be taken in such a way that the value of ratio is less than 1, i.e., the numerator should be less than the denominator.)

In the above case, the value of the ratio of income = $\frac{3}{5} = 0.6$ and value of ratio of expenses = $\frac{1}{3} = 0.33$

Since the value of ratio of expenses < value of the ratio of income, we cannot determine who is saving more.

However, in the above question, if we take the ratio of income of Vinay and Arun as 3:5 and the ratio of their expenses as 3:1, then Arun is saving

- If $a : b = 7 : 9$ and $b : c = 5 : 7$, then what is $a : c$
(a) 5 : 9 (b) 3 : 5
(c) 7 : 21 (d) 7 : 15
- If $x = \frac{1}{3}y$ and, then $x : y : z$, is equal to
(a) 3 : 2 : 1 (b) 1 : 2 : 6
(c) 1 : 3 : 6 (d) 2 : 4 : 6
- The ratio of two numbers is 3 : 8 and their difference is 115. The smaller of two number is :
(a) 184 (b) 194
(c) 69 (d) 59
- Four number are in the ratio 1 : 2 : 3 : 4. Their sum is 16, The sum of the first and fourth number is equal to:
(a) 5 (b) 8
(c) 10 (d) 80
- A and B have money in the ratio 2 : 1. If A gives Rs. 2 to B, The money will be in the ratio 1 : 1. What were the initial amount they had?
(a) Rs. 12 and Rs. 6 (b) Rs. 16 and Rs. 8
(c) Rs. 8 and Rs. 4 (d) Rs. 6 and Rs. 3

- Rs.180 contained in a box consists of one rupee, 50 paise and 23 paise coins in the ratio 2 : 3 : 4. What is the number of 50 piece coins?
(a) 60 (b) 110
(c) 150 (d) 180
- By mistake instead of dividing Rs.117 among, A,B,C. in the ratio $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$ it was divided in the ratio of 2 : 3 : 4. Who gains the most and how much. (a) A, Rs. 28 (b) B, Rs. 3
(c) C, Rs. 20 (d) C, Rs. 25
- Divide Rs.1250 among A, B, C so that A gets $\frac{1}{3}$ of B's share and C gets $\frac{2}{9}$ of B's share and C get $\frac{3}{4}$ of A's share.
(a) Rs. 200, Rs. 800, Rs. 250 (b) Rs. 200, Rs. 900, Rs. 150
(c) Rs. 150, Rs. 800 Rs. 300 (d) Rs. 200, Rs. 900 Rs. 75
- If $P:Q = r : s, t:u = 2 : 3$, then $(mp + nr + ot) : (nq + ns + ou)$ is equal to:
(a) 1 : 3 (b) 1 : 2
(c) 2 : 3 (d) 3 : 2
- If $a : b = c : d = e : f = 1 : 2$, then $(pa + qc + re) : (pb + qd + rf)$ is
(a) $p : (q+r)$ (b) $(p+q) : r$
(c) 2:3 (d) 1:2
- If $x : y = 3 : 1$ then $x^3 - y^3 : x^3 + y^3 = ?$
(a) 13 : 14 (b) 14 : 13
(c) 10 : 11 (d) 11 : 10
- The fourth proportional to 12, 21, 8 is:
(a) 8.9 (b) 56
(c) 14 (d) 17
- The ratio $2^{1.5} : 2^{0.5}$ is the same as :
(a) 2 : 1 (b) 3 : 1
(c) 6 : 1 (d) 3 : 2
- If $m : n = 3 : 2$, then $(4m + 5n) : (4m - 5n)$ is equal to :
(a) 4 : 9 (b) 9 : 4
(c) 11 : 1 (d) 9 : 1
- The sum of two numbers is 40 and their difference is 4, The ratio of the number is
(a) 21 : 19 (b) 22 : 9
(c) 11 : 9 (d) 11 : 18
- If a sum of money is to be divided A, B, C such that A's share to twice B's share and B's share is 4 times C's share then their share are in the ratio :
(a) 1 : 2 : 4 (b) 1 : 4 : 1
(c) 8 : 4 : 1 (d) 2 : 4 : 1
- How many sides does a regular polygon have whose interior and exterior angles are in the ratio 2 : 1 ?
(a) 3 (b) 5
(c) 6 (d) 12
- The smallest integer, which subtracted from both the terms of 6 : 7 gives a ratio less than 16 : 21 is:
(a) 5 (b) 4
(c) 3 (d) 2

19. A man leaves Rs.8,600 to be divided among 5 sons, 4 daughters and 2 nephews, If each daughter receives four times as much as each nephew and each son receives five times as much as each nephew, how much does each daughter receive ?
 (a) Rs. 100 (b) Rs. 600
 (c) Rs. 800 (d) Rs. 1000
20. If $A : B = 3 : 4$, $B : C = 5 : 7$ and $C : D = 8 : 9$ then $A : D$ is equal to:
 (a) 3 : 7 (b) 7 : 3
 (c) 21 : 10 (d) 10 : 21
21. Harsha is 40 years old and Ritu is 60 years old. How many years ago was the ratio of their ages 3 : 5 ?
 (a) 10 years (b) 20 years
 (c) 37 years (d) 5 years
22. The ratio of present age of two brothers is 1 : 2 and 5 years back the ratio was 1 : 3. What will be the ratio of their age after 5 years ?
 (a) 1 : 4 (b) 2 : 3
 (c) 3 : 5 (d) 5 : 6
23. Four years ago, the ratio of the age of A and B was 2 : 3 and after four years it will becomes 5 : 7. Find their present age.
 (a) 36 years and 40 years (b) 32 years and 48 years
 (c) 40 years and 56 years (d) 36 years and 52 years
24. The ratio of two numbers is 10 : 7 and their difference is 105. The sum of these numbers is:
 (a) 595 (b) 805
 (c) 1190 (d) 1610
25. The product of two positive integers is 1575 and their ratio is 9 : 7. The smaller integer is:
 (a) 25 (b) 35
 (c) 45 (d) 70
26. Two numbers are in the ratio 5 : 7. On diminishing each of there by 40, they become in the ratio 17 : 27. The difference of the numbers is :
 (a) 18 (b) 52
 (c) 137 (d) 50
27. The ratio of the number of boys and girls of a school with 504 students is 13 : 11. What will be the new ratio if 12 more girls area admitted?
 (a) 91 : 81 (b) 11 : 91
 (c) 9 : 10 (d) 10 : 9
28. Two numbers are in the $\frac{3}{2} : \frac{8}{3}$ when each of these is increased by 15, they become in the ratio $\frac{5}{3} : \frac{5}{2}$. The greater of the numbers is :
 (a) 27 (b) 36
 (c) 48 (d) 64
29. The students in three classes are in the ratio 2 : 3 : 5. If 40 students are increased in each class, the ratio changes to 4 : 5 : 7. Originally, The total number of students was :
 (a) 100 (b) 180
 (c) 200 (d) 400
30. The students in three classes are in the ratio 2 : 3 : 5. If 20 students are increased in each class, the ratio changes to 4 : 5 : 7. Originally the total number of students was :
 (a) 50 (b) 90
 (c) 100 (d) 150
31. Zinc and copper are in the ratio of 5 : 3 in 200 gm of an alloy. How much grams of copper be added to make the ratio as 3 : 5?
 (a) $400/3$ (b) $1/200$
 (c) 72 (d) 66
32. The ratio of copper and zinc in brass is 13 : 7. How much zinc will be there in 100 kg of brass?
 (a) 22 kg. (b) 55 kg.
 (c) 35 kg. (d) 40 kg.
33. In 30 litres mixture of acid, the ratio of acid and water is 2 : 3. What amount of water should be added to the mixture so that the ratio of acid and water becomes 2 : 5 ?
 (a) 10 litres (b) 15 litres
 (c) 18 litres (d) 12 litres
34. A and B have monthly incomes in the ratio 5 : 6 and monthly expenditures in the ratio 3 : 4. If they save Rs 1800 and Rs.1600 respectively, find the monthly income of B
 (a) Rs 3400 (b) Rs. 2700
 (c) Rs. 1720 (d) Rs. 7200
35. The ratio of income of two persons is 5 : 3 and that of their expenditures is 9 : 5, find the income of each person, if they save 1,300 and R 900 respectively.
 (a) Rs.4,000, Rs.2,400 (b) Rs.3,000, Rs.1,800
 (c) Rs. 5,000, Rs. 3,000 (d) Rs. 4,500, Rs. 2,700
36. Divide Rs. 7500 among A, B and C such that A's share to B's share is in ratio 5 : 2 and B's share to C's share is in the ratio 7 : 13. How much will B receive?
 (a) Rs. 1,400 (b) Rs 3,500
 (c) Rs 2,600 (d) Rs 7,000
37. A sum of R 1240 is distributed among A, B and C such that the ratio of amount received by A and B is 6 : 5 and that of B and C is 10 : 9 respectively. Find the share of C.
 (a) Rs 480, (b) Rs 360
 (c) Rs 400 (d) Rs 630
38. A and B together have 158, C has 101 less than what A and B together have, and B has Rs. 23 more than C. The amount of A is :
 (a) Rs. 80 (b) Rs. 78 (c) Rs. 57 (d) Rs. 88
39. If $a : b = 2/9 : 1/3$, $b : c = 2/7 : 5/14$ and $d : c = 7/10 : 3/5$ then $a : b : c : d$ is
 (a) 4 : 6 : 7 : 9 (b) 16 : 24 : 30 : 35
 (c) 8 : 12 : 15 : 7 (d) 30 : 35 : 24 : 16
40. The ratio of age of two boys is 5 : 6. After two years the ratio will be 7 : 8. The ratio of their age after 12 years will be:
 (a) $22/24$ (b) $15/16$

- (c) 17/18 (d) 11/12
41. Three numbers are in the ratio of 3 : 2 : 5 and the sum of their squares is 1862, The smallest of these number is
(a) 24 (b) 21
(c) 14 (d) 35
42. The sum of three numbers is 116. The ratio of second to the third is 9 : 16 and the first to the third is: 4, The second number is:
(a) 30 (b) 32
(c) 34 (d) 36
43. The sum of three numbers is 98. If the ratio of the first to the second is 2 : 3 and that of the second to the third is 5 : 8, then the second number is
(a) 49 (b) 48
(c) 30 (d) 20
44. Two numbers are in the ratio 5 : 7. If 9 is subtracted from each of them, their ratio becomes 7 : 11. The difference of the numbers is:
(a) 6 (b) 12
(c) 15 (d) 18
45. Two numbers are in the ratio 3 : 5. If 9 is subtracted from each then they are in the ratio 12 : 23. Find the smaller number :
(a) 27 (b) 33
(c) 49 (d) 55
46. In an alloy, the ratio of copper and zinc is 5 : 2 .If 1250 kg.of zinc is mixed in 17 kg 500 gm of alloy then the ratio of copper and zinc will be.
(a) 2: 1 (b) 2 : 3
(c) 3 : 2 (d) 1 : 2
47. A mixture contains spirit and water in the ratio 3 : 2. If it contains 3 litres more spirit than water the quantity of spirit in the mixture is
(a) 10 litres (b) 12 litres
(c) 8 litres (d) 9 litres
48. A mixture of 30 litres contains milk and water in the ratio of 7 : 3 . How much water should be added to it so that the ratio of milk and water become 3: 7 ?
(a) 40 litres (b) 49 litres
(c) 56 litres (d) 63 litres
49. The income of A, B and C are in the ratio 7 : 9 : 12 and their spending are in the ratio 8 : 9 : 15. If A saves $\frac{1}{4}$ th.of his income then the saving of A, B and C are in the ratio of :
(a) 56 : 99 : 69 (b) 69 : 56 : 99
(c) 99 : 56: 69 (d) 99 : 69 : 56
50. The ratio of income of P and Q is 3 : 4 and the ratio of their expenditures is 2 : 3. If both of them save 6000 , the income of P is:
(a) Rs. 20000 (b) Rs. 12000
(c) Rs. 18000 (d) Rs. 24000
51. If 378 coins consists of 1 rupee, 50 paise and 25 paise coins, whose values are in the ratio 13:11 :7.The number of 50 paise coins will be:
(a) 132 (b) 128
(c) 136 (d) 133
52. A bag contains Rs. 90 in coins of nominations of 50 paise, 25 paise and 10 paise. If coins of 50 paise, 25 paise and 10 paise are in the ratio 2 : 3 : 5, then the number of 25 paise coins in the bag is
(a) 80 (b) 120
(c) 100 (d) 135
53. Rs. 3400 is divided among A, B, C, D in such a way that the share of A and B, B and C, C and D may be as 2 : 3, 4 : 3 and 2 : 3 respectively. The sum of shares of B and D is:
(a) Rs. 2040 (b) Rs. 1680
(c) Rs. 2000 (d) Rs. 1720
54. A sum of Rs. 370 is to be divided among A, B and C such that $\frac{A's\ share}{B's\ share} = \frac{B's\ share}{C's\ share} = \frac{3}{4}$ A's share (in rupees) is
(a) 240 (b) 120
(c) 100 (d) 90
55. Two numbers are in the ratio 17: 45. One third of the smaller is less than $\frac{1}{5}$ of the bigger by 15. The smaller number is:
(a) $51/2$ (b) $135/2$
(c) $153/2$ (d) $173/2$
56. Rs. 6200 divided into three parts proportional to $\frac{1}{2} : \frac{1}{3} : \frac{1}{5}$ area respectively.
(a) Rs. 3000, Rs. 2000 , Rs. 1200 (b) Rs. 3500, Rs. 1500, Rs. 1200
(c) Rs. 2500, Rs. 2000, Rs. 1700 (d) Rs. 2200 , Rs. 3000 , Rs. 1000
57. In a 45 litres mixture of milk and water, the ratio of the milk to water is 2 : 1. When some quantity of water is added to the mixture, this ratio becomes 1 : 2. The quantity of water added is:
(a) 10 litres (b) 21 litres
(c) 35 litres (d) 45 litres
58. A barrel contains a mixture of wine and water in the ratio 3 : 1. How much fraction of the mixture must be drawn off and substituted by water so that the ratio of wine and water in the resultant mixture becomes 1 : 1 ?
(a) $\frac{1}{4}$ (b) $\frac{1}{3}$
(c) $\frac{3}{4}$ (d) $\frac{2}{3}$
59. A man spends a part of his monthly income and saves a part of it, the ratio of his expenditure to his saving is 26 : 3. If his monthly income is Rs. 7250. what is the amount of his monthly savings ?
(a) Rs. 350 (b) Rs. 290
(c) Rs. 750 (d) Rs. 780
60. There are 225 consisting of one rupee, 50 paise and 25 paise coins, the ratio of their numbers in that order is 8: 5 : 3. The number of one-rupee coins is :
(a) 80 (b) 112
(c) 160 (d) 172
61. Rs. 750 are divided among A, B and C in such a manner that A : B is 5 : 2 and B : C is 7: 13. What is A's share ?
(a) Rs. 350 (b) Rs. 260
(c) Rs. 140 (d) Rs. 250
62. An amount of money is to be distributed among P, Q and R in the ratio of 2 : 7 : 9. The total of P's and Q's

- share is equal to R's share. What is the difference between the shares of P and Q?
 (a) Rs. 5000 (b) Rs. 7500
 (c) Rs. 9000 (d) Information inadequate
63. If $A:B = 3:4$, $B:C = 5:7$ and $C:D = 8:9$ then A : Dis equal to
 (a) 3 : 7 (b) 7 : 3
 (c) 21 : 10 (d) 10 : 21
64. 94 is divided into two parts in such a way that the fifth part of the first and the eight part of the second are in the ratio 3 : 4. the first part is:
 (a) 30 (b) 36
 (c) 40 (d) 28
65. If $a : b = 5 : 7$ and $c : d = 2a : 3b$ then $a : c : b : d$ is :
 (a) 20 : 38 (b) 50 : 147
 (c) 10 : 21 (d) 50 : 151
66. If $x : y = 3 : 2$, then the ratio $2x^2 + 3y^2 : 3x^2 - 2y^2$ is equal to:
 (a) 12 : 5 (b) 6 : 5
 (c) 30 : 19 (d) 5 : 3
67. If $a : b = b : c$, then $a^4 : b^4$ is equal to:
 (a) $ac : b^2$ (b) $c^2 : a^2$
 (c) $c^2 : a^2$ (d) $b^2 : ac$
68. If $A : B = \frac{1}{2} : \frac{3}{8}$, $B : C = \frac{1}{3} : \frac{5}{9}$ and $C : D = \frac{5}{6} : \frac{3}{4}$, then the ratio A : B : C : Dis :
 (a) 6 : 4 : 8 : 10 (b) 6 : 8 : 9 : 10
 (c) 8 : 6 : 10 : 9 (d) 4 : 6 : 8 : 1
69. If $A : B : C = 2 : 3 : 4$ then ratio $\frac{A}{B} : \frac{B}{C} : \frac{C}{A}$ is equal to:
 (a) 8 : 9 : 16 (b) 8 : 9 : 12
 (c) 8 : 9 : 24 (d) 4 : 9 : 12
70. If $a : b = c : d = e : f = 1 : 2$, then $(3a + 5c + 7e) : (3b + 5d + 7f)$ is:
 (a) 8 : 7 (b) 2 : 1
 (c) 1 : 4 (d) 1 : 2
71. The ratio of present age of two brothers is 1 : 2 and 5 years back the ratio was 1 : 3. What will be the ratio of their age after 5 years ?
 (a) 1 : 4 (b) 2 : 3.
 (c) 3 : 5 (d) 5 : 6
72. The ratio of the present age of Puneet and Appu is 2 : 3. After 3 years the ratio of their age will be 3 : 4. The present age of Puneet is:
 (a) 3 years (b) 6 years
 (c) 9 years (d) 4 years
73. Of the three numbers, the ratio of the first and the second is 8 : 9 and that of the second and third is 3 : 4. If the product of the first and third number is 2400, then the second number is :
 (a) 45 (b) 40
 (c) 24 (d) 10
74. Two numbers are in the ratio 2 : 3. If 2 is subtracted from the first and 2 is added to thesecond , the ratio becomes 1 : 2. The sum of the numbers is:
 (a) 30 (b) 28
 (c) 24 (d) 10
75. The numbers are in the ratio $\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$. The difference between the greatest and the smallest number is 36. The numbers are:
 (a) 72,84,108 (b) 60,72,96
 (c) 72,84,96 (d) 72,96,108
76. The students in three classes are in the ratio 2 : 3 : 5. If 20 students are increased in each class, the ratio changes to 4 : 5 : 7. Originally the total number of students was :
 (a) 50 (b) 90
 (c) 100 (d) 150
77. There is 81 litres pure milk in a container. One-third of milk is replaced by water in the container. Again one-third of mixture is extracted and equal amount of water is added. What is the ratio of milk to water in the new mixture ?
 (a) 1 : 2 (b) 1 : 1
 (c) 2 : 1 (d) 4 : 5
78. In 80 litres mixture of milk and water the ratio of amount of milk to that of amount of water is 7 : 3. In order to make this ratio 2 : 1, how many litres of water should be added ?
 (a) 5 (b) 6
 (c) 3 (d) 4
79. The annual income of A and B are in the ratio 4 : 3 and the ratio of their expenditures is 3 : 2. If each of them saves Rs. 600 in the year, the annual income of A is
 (a) Rs. 4800 (b) Rs. 1800
 (c) Rs. 1200 (d) Rs. 2400
80. The ratio of income of two persons is 5:3 and that of their expenditures is 9 : 5. If they save Rs. 2600 and Rs. 1800 respectively. Their incomes are :
 (a) Rs. 8000 : Rs. 4800 (b) Rs. 6000 : Rs. 3600
 (c) Rs. 10000 : Rs. 6000 (d) Rs. 9000 : Rs. 5400
81. The monthly income of two persons are in the ratio 2 : 3 and their monthly expenses are in the ratio 5 : 9. If each of them saves Rs. 600 per Month, then their monthly incomes are
 (a) Rs. 1,500 : Rs. 2,2250 (b) Rs. 1,200 : Rs. 1,800
 (c) Rs. 1,600 : Rs. 2,400 (d) Rs. 2,100 : Rs. 1,400
82. Rs.68000 is divided among A, B and C in the ratio of $\frac{1}{2} : \frac{1}{4} : \frac{5}{16}$. The difference of the greatest and the smallest part is :
 (a) Rs. 6000 (b) Rs. 14440
 (c) Rs. 9200 (d) Rs. 16000
83. The ratio of the first and second class train fares between two stations is 3 : 1 and that of the numbers of passengers travelling between the two stations by first and second classes is 1 : 50. If on a particular day Rs. 1325 are collected from passengerstravelling between the two stations. Then the amount collected from the second class passengers is:
 (a) Rs. 1,250 (b) Rs. 1,000
 (c) Rs.850 (d) Rs. 750
84. If $p : q : r = 1 : 2 : 4$, then $\sqrt{5p^2 + q^2 + r^2}$ is equal to
 (a) 5 (b) 2q
 (c) 5p (d) 4r
85. The mean proportional between $(3 + \sqrt{2})$ and $(12 - \sqrt{32})$ is:
 (a) $\sqrt{7}$ (b) $2\sqrt{7}$

- (c) 6 (d) $\frac{15-3\sqrt{2}}{2}$
86. If $x : y = 2 : 3$, then the value of $\frac{3x+2y}{9x+5y}$ is equal to :
 (a) 11/4 (b) 4/11
 (c) 1/2 (d) 5/14
87. If a, b, c are three numbers such that $a : b = 3 : 4$ and $b : c = 8 : 9$ then $a : c$ is equal to
 (a) 1 : 3 (b) 2 : 3
 (c) 3 : 2 (d) 1 : 2
88. The ratio of the ages of a father and his son 10 years hence will be 5 : 3, while 10 years ago it was 3 : 1. The ratio of the age of the son to that of the father at present is:
 (a) 1 : 2
 (c) 2 : 3 (b) 2 : 1 (d) 2 : 5
89. The ratio of the number of boys and that of girls in a school having 504 students is 13 : 11. What will be the new ratio if 3 more girls are admitted ?
 (a) 7 : 6 (b) 6 : 7
 (c) 10 : 11 (d) 13 : 14
90. The ratio of the number of ladies to that of gents at a party was 3 : 2, When 20 more gents joined the party, the ratio was reversed. The number of ladies present at the party was
 (a) 36 (b) 32
 (c) 24 (d) 16
91. Vessels A and B contain mixtures of milk and water in the ratio 4 : 5 and 5 : 1 respectively. In what ratio should quantities of mixture be taken from A form a mixture in which milk to water is in the ratio 5 : 4?
 (a) 2 : 5 (b) 4 : 3
 (c) 5 : 2 (d) 2 : 3
92. A man has in all Rs. 640 in the denominations of one-rupee, five-rupee and ten-rupee notes. The number of each type of notes are equal. What is the total number of notes he has ?
 (a) 150 (b) 120
 (c) 100 (d) 90
93. A bag contains three types of coins 1 rupee-coins, 50p-coins and 25 p-coins totaling 175 coins, If the total value of the coins of each kind be the same, the total amount in the bag is :
 (a) Rs. 75 (b) Rs. 175
 (c) Rs. 300 (d) Rs. 126
94. If $a : b : c = 2 : 3 : 4$ and $2a - 3b + 4c = 33$, then the value of c is:
 (a) 6 (b) 9
 (c) 12 (d) $66/7$
95. If $a : b = c : d$, then $\frac{ma+nc}{mb+nd}$ is equal to :
 (a) a/b (b) c/d
 (c) $\frac{a+c}{b+d}$ (d) $\frac{c-a}{b-a}$
96. The ratio of a and b is 4 : 5 and that of B to C is 2 : 3. If A equals 800, C equal to :
 (a) 1000 (b) 1200
 (c) 1500 (d) 2000
97. If $a : b : c = 7 : 3 : 5$, then $(a + b + c)(2a + b - c)$ is equal to:
 (a) 1 : 2 (b) 3 : 2
 (c) 3 : 4 (d) 5 : 4
98. If $A : B = 2 : 3$ and $B : C = 4 : 5$, then $A : B : C$ is:
 (a) 2 : 3 : 5 (b) 5 : 4 : 6
 (c) 6 : 4 : 5 (d) 8 : 12 : 15
99. If two times of A is equal to three times of B and also equal to four times of C, then $A : B : C$ is:
 (a) 2 : 3 : 4 (b) 3 : 4 : 2
 (c) 4 : 6 : 3 (d) 6 : 4 : 3
100. If $A : B = 2 : 3$, $B : C = 2 : 4$ and $C : D = 2 : 5$, then $A : D$ is equal to:
 (a) 2 : 15 (b) 2 : 45
 (c) 1 : 5 (d) 3 : 5
101. 33630 area divided among A, B and C in such a manner that the ratio of the amount of A to that of B is 3 : 7 and the ratio of the amount of B to that of C is 6 : 5. The amount of money received by B is :
 (a) Rs. 14868 (b) Rs. 16257
 (c) Rs. 13290 (d) Rs. 12390
102. The sum of the age of a father and his son is 100 years now. 5 years ago their age were in the ratio of 2 : 1. The ratio of the age of father and son after 10 years will be:
 (a) 5 : 22 (b) 4 : 3
 (c) 10 : 7 (d) 5 : 3
103. the ratio of present ages of Rahul and Rashmi is 2 : 1. The ratio of their ages after 30 year will be 7 : 6. What is the present age of Rahul?
 (a) 6 years (b) 10 Years
 (c) 12 years (d) 20 years
104. The sum of three numbers is 68. If the ratio of the first to the second be 2 : 3 and that of the second to the third be 5 : 3, then the second number is:
 (a) 30 (b) 58
 (c) 20 (d) 48
105. Two numbers are in the ratio 4 : 5 and their L.C.M. is 180. The smaller number is:
 (a) 9 (b) 15
 (c) 36 (d) 45
106. In a school having strength 286, the ratio for boys and girls get admitted into the school, the ratio of boys and girls becomes:
 (a) 12 : 7 (b) 10 : 7
 (c) 8 : 7 (d) 4 : 3
107. 200 liters of a mixture contains milk and water in the ratio 17 : 3. After the addition of some more milk to it, the ratio of milk to water in the resulting mixture becomes 7 : 1. The quantity of milk added to it was :
 (a) 20 liters (b) 40 liters
 (c) 60 liters (d) 80 liters
108. The milk and water in a mixture and in the ratio 7 : 5. When 15 litres of water are added to it, the ratio of milk and water in the new mixture becomes 7 : 8. The total quantity of water in the new mixture is:

- (a) 35 liters (b) 40 liters
(c) 60 liters (d) 96 liters
- 109.** The ratio of incomes of A and B is 5 : 6. If A gets Rs.11,100 less than B, their total income (in rupees) is:
(a) 9900 (b) 122100
(c) 14400 (d) 10000
- 110.** A box contains 1 rupee, 50 paise and 25 paise coins in the ratio 8 : 5 : 3. If the total amount of money in the box is Rs.112.5, the number of 50 paise coins is:
(a) 80 (b) 50
(c) 30 (d) 42
- 111.** In a bag, there are three types of coins, 1 rupee, 50 paise, and 25 paise in the ratio of 3 : 8 : 20, their total value is Rs.372. The total number of coins is:
(a) 1200 (b) 961
(c) 744 (d) 612
- 112.** In an innings of a cricket match three players A, B and C scored a total of 361 runs. If the ratio of the number of runs scored by A to that scored by B and also number of runs scored by B to that scored by C be 3 : 2, the number of runs scored by A was:
(a) 171 (b) 181
(c) 185 (d) 161
- 113.** In an examination, the number of those who passed and the number of those who failed were in the ratio 25 : 4. If five more had appeared and the number of failures was 2 less than earlier, the ratio of passers to failures would have been 22 : 3. Total number who appeared at the examination is:
(a) 145 (b) 150
(c) 155 (d) 1180
- 114.** If $a : b : c = 3 : 4 : 7$, then the ratio $(a + b + c) : C$ is equal to
(a) 2 : 1 (b) 14 : 3
(c) 7 : 2 (d) 1 : 2
- 115.** If A and B are in the ratio 3 : 4, and B and C in the ratio 12 : 13, then A and C will be in the ratio:
(a) 3 : 13 (b) 9 : 13
(c) 36 : 13 (d) 13 : 9
- 116.** If $A : B = 3 : 2$ and $B : C = 3 : 4$ then $A : C$ is equal to:
(a) 1 : 2 (b) 2 : 1
(c) 8 : 9 (d) 9 : 8
- 117.** If $\frac{2}{3}$ of A = 75% of B = 0.6 of C, then $A : B : C$ is
(a) 2 : 3 : 3 (b) 3 : 4 : 5
(c) 4 : 5 : 6 (d) 9 : 8 : 10
- 118.** If $A : B = 3 : 5$ and $B : C = 4 : 7$, then $A : B : C$ is:
(a) 6 : 9 : 14 (b) 3 : 4 : 7
(c) 12 : 20 : 21 (d) 12 : 20 : 35
- 119.** In 40 litres mixture of milk and water the ratio of milk to water is 7 : 1. In order to make the ratio of milk and water 3 : 1, the quantity of water (in litres) that should be added to the mixture will be (a) 6 (b) $\frac{13}{2}$
(c) $\frac{20}{3}$ (d) $\frac{27}{4}$
- 120.** A jar contained a mixture of two liquids A and B in the ratio 4 : 1. When 10 litres of the mixture was taken out and 10 litres of liquid B was poured into the jar, this ratio became 2 : 3. The quantity of liquid A contained in the jar initially was:
(a) 4 litres (b) 8 litres
(c) 16 litres (d) 40 litres
- 121.** In a mixture of 75 litres, the ratio of milk to water is 2 : 1. The amount of water to be further added to the mixture so as to make the ratio of the milk to water 1 : 2 will be:
(a) 45 litres (b) 60 litres
(c) 75 litres (d) 80 litres
- 122.** A and B are two alloys of gold and copper prepared by mixing metals in the ratio 5 : 3 and 5 : 11 respectively. Equal quantities of the alloys are melted to form a third alloy - C. The ratio of gold and copper in alloy C is:
(a) 25 : 23 (b) 33 : 25
(c) 15 : 17 (d) 17 : 15
- 123.** Two types of alloy possess gold and silver in the ratio of 7 : 22 and 21 : 37. In what ratio should these alloys be mixed so as to have a new alloy in which gold and silver would exist in the ratio 25 : 62?
(a) 13 : 8 (b) 8 : 13
(c) 13 : 12 (d) 6 : 9
- 124.** In an alloy, zinc and copper are in the ratio 1 : 2. In the second alloy, the same elements are in the ratio 2 : 3. If these two alloys be mixed to form a new alloy in which two elements are in the ratio 5 : 8, the ratio of these two alloys in the new alloy is:
(a) 3 : 10 (b) 3 : 7
(c) 10 : 3 (d) 7 : 3
- 125.** A box has 210 coins of denominations one rupee and fifty paise only. The ratio of their respective values is 13 : 11. The number of one-rupee coins is:
(a) 65 (b) 66
(c) 77 (d) 78
- 126.** A boy has a few coins of 50 paise, 25 paise and 10 paise in the ratio 1 : 32 : 3. If the total amount the coins is Rs. 8.80, The number of 10 paise coins is:
(a) 5 (b) 10
(c) 15
(d) 30
- 127.** The salaries of A, B, and C are in the ratio 1 : 3 : 4. If the salaries are increased by 5%, 10% and 15% respectively, then the increased salaries will be in the ratio:
(a) 20 : 66 : 95 (b) 21 : 66 : 95
(c) 21 : 66 : 92 (d) 19 : 66 : 92
- 128.** Total marks obtained by Arun in English and Mathematics are 170. If the difference between his marks in these two subjects is 10. Then the ratio of his marks in these subjects is
(a) 7 : 8 (b) 8 : 7

- (c) 9 : 8 (d) 9 : 7
129. If $x : y = 2 : 1$, then $(x^2 - y^2)$
 (a) 3 : 5 (b) 5 : 3
 (c) 4 : 5 (d) 5 : 6
130. There are three numbers A, B, C such that twice A is equal to thrice B and four times B is equal to five times C, Then the ratio between A and C is:
 (a) 3 : 4 (b) 8 : 15
 (c) 15 : 8 (d) 4 : 3
131. The two numbers are in the ratio 2 : 3 and their product is 96. The sum of the numbers is :
 (a) 5 (b) 20
 (c) 101 (d) 102
132. The ratio between two number is 3 : 4. If each number is increased by 6, the ratio becomes 4:5. The difference between the numbers is:
 (a) 1 (b) 3
 (c) 6 (d) 8
133. Three numbers are in the ratio 5 : 6 : 7, If the product of the numbers is 5670, then the greatest number is:
 (a) 15 (b) 18
 (c) 21 (d) 28
134. Which number when added to each of the numbers 6, 7, 15, 17 will make the resulting numbers proportional?
 (a) 6 (b) 5
 (c) 4 (d) 3
135. In a glass, milk and water are mixed in the ratio 3 : 5 and in another glass they are mixed in the ratio 6 : 1. In what ratio should the contents of the two glasses be mixed together so that the new mixture contains milk and water in the ratio 1 : 1?
 (a) 20 : 7 (b) 8 : 3
 (c) 27 : 4 (d) 25 : 9
136. Incomes of A and B are in the ratio 4 : 3 and their annual expenses in the ratio 3 : 2. If each save Rs. 60,000 at the end of the year, the annual income of A is:
 (a) Rs. 1,20,000 (b) Rs. 1,50,000
 (c) Rs. 2,40,000 (d) 3,60,000
137. The weight of Mr. Gupta and Mrs. Gupta are in the ratio 7 : 8 and their total weight is 120 kg. After taking a dieting course Mr. Gupta reduces by 6 kg and the ratio between their weights changes to 5 : 6, So Mrs. Gupta has reduced by :
 (a) 2 kg (b) 4 kg
 (c) 3 kg (d) 5 kg
138. The ratio of the first and second class fares between two railway stations is 4 : 1. and that of the number of passengers travelling by first and second classes is 1 : 40. If on a day Rs. 1,100 are collected as total fare, the amount collected from the first class passengers is
 (a) Rs. 315 (b) Rs. 275
 (c) Rs. 137.50 (d) Rs. 100
139. If Rs. 1000 is divided between A and B in the ratio 3 : 2, then A will receive:
 (a) Rs. 400 (b) Rs. 500
 (c) Rs. 600 (d) Rs. 800
140. If $W_1 : W_2 = 2 : 3$ and $W_1 : W_2 = 1 : 2$ then $W_2 : W_3$ is:
 (a) 3 : 4 (b) 4 : 3
 (c) 2 : 3 (d) 4 : 5
141. If $3x = 5y = 4z$, then $x : y : z$ is equal to:
 (a) 9 : 12 : 16 (b) 20 : 12 : 15
 (c) 15 : 10 : 9 (d) 8 : 5 : 3
142. If $A : B = 3 : 4$ and $B : C = 6 : 5$ then $A : (A + C)$ is equal to
 (a) 9 : 10 (b) 10 : 9
 (c) 9 : 19 (d) 19 : 9
143. If a and b are rational numbers and $a + b\sqrt{3} = \frac{1}{2 - \sqrt{3}}$, then a : b is equal to:
 (a) 2 : 1 (b) 2 : 3
 (c) $\sqrt{3} : 1$ (d) $-\sqrt{3} : 1$
144. If $A : B = 3 : 4$ and $B : C = 8 : 9$, then $A : B : C$ is:
 (a) 8 : 6 : 9 (b) 9 : 8
 (c) 6 : 8 : 9 (d) 3 : 32 : 9
145. If $A = \frac{1}{4}B$ and $B = \frac{1}{2}C$, then $A : B : C$ is :
 (a) 8 : 4 : 1 (b) 4 : 3 : 1
 (c) 1 : 4 : 8 (d) 1 : 2 : 4
146. If $2A = 3B = 4C$, then $A : B : C$ is :
 (a) 2 : 3 : 4 (b) 4 : 3 : 2
 (c) 6 : 4 : 3 (d) 3 : 4 : 6
147. The ratio $4^{3.5} : 2^5$ is the same as:
 (a) 4 : 1 (b) 2 : 1
 (c) 1 : 2 (d) 1 : 4
148. If $A : B = 1 : 2$, $B : C = 3 : 4$, $C : D = 6 : 9$ and $D : E = 12 : 16$ then $A : B : C : D$ is equal to:
 (a) 1 : 3 : 6 : 12 : 16 (b) 2 : 4 : 6 : 9 : 16
 (c) 3 : 4 : 8 : 12 : 16 (d) 3 : 6 : 8 : 12 : 16
149. If $x : y = 2 : 5$ then $(5x + 3y) : (5x - 3y)$ is equal to:
 (a) 5 (b) 3
 (c) -3 (d) -5
150. The ratio of the age of a father to that of his son is 5 : 2. If the product of their age in years is 1000 then the father age (in year) after 10 years will be:
 (a) 50 (b) 60
 (c) 80 (d) 100
151. What number should be added to each of 6, 14, 18 and 38, so that the resulting numbers make a proportion.
 (a) 1 (b) 2
 (c) 3 (d) 4
152. Two numbers are in the ratio 3 : 4 and their LCM is 180. The first number is:
 (a) 15 (b) 60
 (c) 36 (d) 45
153. Two numbers are in the ratio 3 : 5 and their LCM is 225. The smaller number is:
 (a) 45 (b) 60
 (c) 75 (d) 90
154. The ratio of two numbers is 3 : 4 and their LCM is 48. The sum of the two numbers is :

- (a) 32 (b) 28
(c) 26 (d) 24
- 155.** What must be added to each term of the ratio 7 : 11, so as to make it equal to 3 : 4 ?
(a) 8 (b) 7.5
(c) 6.5 (d) 5
- 156.** Two number are in the ratio 7 : 11. If 7 is added to each of the numbers. The ratio becomes 2 : 3. The smaller number is :
(a) 39 (b) 49
(c) 66 (d) 77
- 157.** Two numbers are in the ratio 3 : 5. If each number is increased by 10, the ratio becomes 5 : 7, The smaller number is:
(a) 9 (b) 12
(c) 15 (d) 25
- 158.** The monthly salaries of A, B and C are in the ratio 2 : 3 : 5. If C's monthly salary is Rs. 12,000 more than that of A, then B's annual salary is :
(a) Rs. 1,20,000 (b) Rs. 1,44,000
(c) Rs. 1,80,000 (d) Rs. 2, 40,000
- 159.** The ratio of income and expenditure of a person is 11 : 10. If he saves Rs. 9,000 per annum, his monthly income is:
(a) Rs. 8,000 (b) Rs. 8,800
(c) Rs. 8,500 (d) Rs. 8,250
- 160.** The ratio of the numbers of boys and girls in a school was 5 : 3. Some new boys and girls were admitted to the school, in the ratio 5 : 7. At this, the total number of students in the school became 1200, and the ratio of boys to girls changed to 7:5, The number of students in the school before new admissions was:
(a) 700 (b) 720
(c) 900 (d) 960
- 161.** Three persons walk from place A to place B. Their speeds are in the ratio 4 : 3 : 5, The ratio of the time taken by them to reach B will be :
(a) 10 : 15 : 13 (b) 2 : 3 : 4
(c) 15 : 20 : 12 (d) 16 : 18 : 15
- 162.** Marks of two candidates P and Q are in the ratio 2 : 5 if them marks of P are 120, marks of Q are
(a) 120 (b) 240
(c) 300 (d) 360
- 163.** If A : B = 4 : 9 and A : C = 2 : 3 then (A+B) : (B+C) is:
(a) 15 : 13 (b) 10 : 13
(c) 3 : 10 (d) 13 : 15
- 164.** If $x : y = 3 : 4$, then the value of $\frac{5x - 2y}{7x + 2y}$
(a) $\frac{7}{25}$ (b) $\frac{7}{23}$
(c) $\frac{7}{29}$ (d) $\frac{7}{17}$
- 165.** If $x : y = 3 : 4$, then the value of $(4x - y) : (2x + 3y)$ is:
(a) 4 : 9 (b) 8 : 9
(c) 4 : 3 (d) 8 : 3
- 166.** At present the ratio of the age of Maya and Umaya is 6 : 5 and fifteen years from now, the ratio will get changed to 9 : 8. Maya's present age
(a) 21 years (b) 24 years
(c) 30 years (d) 40 years
- 167.** The ratio of the age of Ram and Rahim 10 years ago was 1 : 3. The ratio of their age five years hence will be 2 : 3. Then the ratio of their present age is:
(a) 1 : 4 (b) 3 : 5
(c) 3 : 4 (d) 2 : 5
- 168.** If the sum of two quantities is equal to three times their difference, then the ratio of the two quantities is:
(a) 1 : 3 (b) 3 : 1
(c) 2 : 1 (d) 2 : 3
- 169.** Three numbers are in the ratio 3 : 4 : 5. The sum of the largest and the smallest equals the sum of the second and 52, The smallest number is:
(a) 20 (b) 27
(c) 39 (d) 52
- 170.** A vessel contains a mixture of two liquids A and B in the ratio 7 : 5. When 9 litres of Inixture is drawn off and the vessel is filled with B, the ratio of A and B becomes 7 : 9. Litres of liquid A contained in the vessel initially was:
(a) 10 (b) 20
(c) 21 (d) 25
- 171.** A container contains two liquids A and B in the ratio 7 : 5. When 9 litres of mixture are drawn off the container isfilled with B theratio of A and B becomes 1 : 1. How manylitres of liquid A was in thecontainer initially?
(a) 26 (b) $147/2$
(c) $27/4$ (d) $107/4$
- 172.** The vessels A and B contain milk and water mixed in the ratio 4 : 3 and 2 : 3. The ratio in which these mixtures be mixed to form a new mixture containing half milk and half water is:
(a) 7 : 5 (b) 6 : 5
(c) 5 : 6 (d) 4 : 3
- 173.** The ratio of the volume of water and glycerine in 240cc of mixture is 1 : 3. The quantity of water (in cc) that should be added to the mixture so that the new ratio of the volumes of water and glycerine becomes 2 : 3 is:
(a) 55 cc (b) 60 cc
(c) 62.5 cc (d) 64 cc
- 174.** In a mixture of 25 litre the ratio of acid to water is 4 : 1. another 3 litre of water is added to the mixture . The ratio of acid to water in the new mixture is:
(a) 5 : 2 (b) 2 : 5
(c) 3 : 5 (d) 5 : 3
- 175.** Two equal vessels are filled with the mixtures of water and milk in the ratio of 3 : 4 and 5 : 3 respectively. If the mixtures are poured into a third vessel, the ratio of water and milk in the third vessel will be:
(a) 15 : 12 (b) 53 : 59
(c) 20 : 9 (d) 59 : 53

- 176.** Two vessels A and B contains acid and water in the ratio 4 : 3 and 5 : 3 respectively. Then the ratio in which these mixtures to be mixed to obtain a new mixture in vessel C containing acid and water in the ratio 3 : 2 is:
 (a) 5 : 8 (b) 7 : 8
 (c) 7 : 5 (d) 4 : 7
- 177.** Two containers have acid and water mixed respectively in the ratio 3 : 1 and 5 : 3. To get a new mixture with ratio of acid to water as 2 : 1 the two types have to be mixed in the ratio :
 (a) 1:2 (b) 2 : 1
 (c) 2 : 3 (d) 3:1.
- 178.** Acid and water are mixed in a vessel A in the ratio of 5 : 2 and If the vessel B in the ratio 8 :5. In what proportion should quantities be taken out from the two vessels so as to form a 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
- 179.** The ratio of spirit and water in two mixtures of 20 litre and 36 litres is 3 : 7 and 7 : 5 respectively. Both the mixtures are mixed together. Now the ratio of the spirit and water in the new mixture is :
 (a) 25 : 29 (b) 9 : 10
 (c) 27 : 29 (d) 27 : 31
- 180.** An alloy contains copper, zinc and nickel in the ratio of 5 : 3 : 2. The quantity of nickel (in kg) that must be added to 100 kg of this alloy to have the new ratio 5 : 3 : 3 is:
 (a) 8 (b) 10
 (c) 12 (d) 15
- 181.** The ratio of the income to the expenditure of a family is 10 : 7. If the family's expenses are 10,500, then savings of the family is
 (a) Rs. 4,500 (b) Rs. 10,000
 (c) Rs. 4,000 (d) Rs. 5,000
- 182.** The ratio of weekly income of A and B is 9 : 7 and the ratio of their expenditures is 4 : 3. If each saves R 200 per week, then the sum of their weekly income is
 (a) Rs. 3,600 (b) Rs. 3,200
 (c) Rs. 4,800 (d) Rs. 5,600
- 183.** The income of A and B are in the ratio 2 : 3 and their expenditures are in the ratio 1 : 2, If each saves K. 24,000, find A's income.
 (a) Rs. 24,000 (b) Rs. 72,000
 (c) Rs. 19,200 (d) Rs. 48,000
- 184.** Ratio between the monthly incomes of A and B is 9 : 8 and the ratio between their expenditures is 8 : 7 .If they save Rs. 500 each, find A's monthly income:
 (a) Rs. 3500 (b) Rs. 4000
 (c) Rs. 4500
 (d) Rs. 5000
- 185.** From each of the two given unequal number. Half the smaller number is subtracted. then, of is five times then the larger one is five times then the smaller one. Then the ratio of the larger to smaller one is:
 (a) 2 : 1 (b) 3 : 2
 (c) 3 : 1 (d) 1 : 4
- 186.** 94 is divided into two parts in such a way that the fifth part of the first and the eight part of the second are in the ratio 3 : 4. The first part is:
 (a) 30 (b) 36
 (c) 40 (d) 28
- 187.** The third proportional to 0.8 and 0.2 is:
 (a) 0.05 (b) 0.8
 (c) 0.4 (d) 0.032
- 188.** On mixing two classes A and B of students having average marks 25 and 40 respectively. The over all average obtained is 30. Find the ratio of the students in the class A and B. The mixing two classes A and B of
 (a) 2 : 1 (b) 5 : 8
 (c) 5 : 6 (d) 3 : 4
- 189.** A fruit seller sold big, medium and small sized apples for Rs. 15, Rs. 10 and Rs. 5 respectively. The total number of apples sold were in the ratio 3 : 2 : 5. Find the average cost of apples.
 (a) 8 Rs. (b) 10 Rs.
 (c) 9 Rs. (d) Rs. 7
- 190.** In a school the ratio of boys to girls is 4 : 3 and the ratio of girls, to teachers is 8 : 1. The ratio of students is and teacher is:
 (a) 56 : 3 (b) 55 : 1
 (c) 49 : 3 (d) 56 : 1
- 191.** If $\frac{3x+5}{5x-2} = \frac{2}{3}$, then the value of x is
 (a) 11 (b) 19
 (c) 23 (d) 7
- 192.** A, B and C are Batsmen. The ratio of the runs scored by them in a certain match are A : B = 5 : 3, and B : C = 4 : 5. In all they scored 564 runs. The number of runs scored by B is : (a) 124 (b) 104
 (c) 14 (d) 144
- 193.** A milkman makes 20% profit by selling milk mixed with water at Rs. 9 per liter. If the cost price of 1 liter pure milk is Rs. 10, then the ratio of milk and water in the mixture is true.
 (a) 3 : 1 (b) 4 : 1
 (c) 3 : 2 (d) 4 : 3
- 194.** The ratio between sumit's and Prakash's age at present is 2 : 3. Sumit is 6 years younger than Prakash. The ratio of Sumit's age to Prakash's age after 6 years will be:
 (a) 2 : 3 (b) 1 : 2
 (c) 4 : 3 (d) 3 : 4
- 195.** The number to be added to each of the numbers 7, 16, 43, 79 to make the numbers in proportion is:
 (a) 2 (b) 3
 (c) 5 (d) 1

- 196.** Two numbers are such that the ratio between them is 4 : 7. If each is increased by 4, the ratio becomes 3 : 5. The larger number is:
 (a) 36 (b) 48
 (c) 56 (d) 64
- 197.** The students in three classes are in the ratio 4 : 6 : 9. If 12 students are increased in each class the ratio changes to 7 : 9 : 12. Then the total number of students in the three classes before the increase is:
 (a) 95 (b) 76
 (c) 100 (d) 114
- 198.** If there is a reduction in the number of workers in a factory in the ratio 15 : 11 and an increment in their wage in the ratio 22 : 25, then the ratio by which the total wage of the workers should be decreased is:
 (a) 6 : 5 (b) 5 : 6
 (c) 3 : 7 (d) 3 : 5
- 199.** Two numbers are in the ratio of 3 : 5. If 9 be subtracted from each, then they are in the ratio of 12 : 23. Find the numbers.
 (a) 15, 28 (b) 36, 115
 (c) 33, 55 (d) 60, 69
- 200.** A and B are two alloys of gold, and copper prepared by mixing metals in ratios 7 : 2 and 7 : 11 respectively. If equal quantities of the alloys are melted to form a third alloy C, the ratio of gold and copper in C will be :
 (a) 7 : 5
 (c) 9 : 5 (b) 5 : 9 (d) 5 : 7
- 201.** A container contains 60 litre of milk. From this container 6 litre of milk was taken out and replaced by water. This process was repeated 207, further two times. The amount of milk left in the container is
 (a) 34.24 litre (b) 39.64 litre
 (c) 43.74 litre (d) 47.6 litre
- 202.** Two vessels A and B contain milk and water mixed in the ratio 8 : 5 and 5 : 2 respectively. The ratio in which these two mixtures be mixed to get a new mixture containing 900/13 % milk:
 (a) 3 : 6 (b) 5 : 2
 (c) 5 : 7 (d) 2 : 7
- 203.** Two vessels contains milk and water in the ratio 3 : 2 and 7 : 3. Find the ratio in which the contents of the two vessels have to be mixed to get a new mixture in which the ratio of milk and water is 2 : 1.
 (a) 2 : 1
 (c) 4 : 1 (b) 1 : 2 (d) 1 : 4
- 204.** In two types of stainless steel the ratio of chromium and steel are 2 : 11 and 5 : 21 respectively. In what proportion should the two types be mixed so that the ratio of chromium to steel in the mixed type becomes 7 : 32 ?
 (a) 2 : 3 (b) 3 : 4
 (c) 1 : 2 (d) 1 : 3
- 205.** A vessel contains a mixture of two liquids A and B in the ratio 7 : 5. When 9 litres of mixture is drained off and the vessel is filled with B, the ratio of A and B becomes 7 : 9, how many litres of liquid A was contained by the vessel initially ?
 (a) 10 litres (b) 20 litres
 (c) 21 litres (d) 25 litres
- 206.** If the annual income of A, B and C are in the ratio 1 : 3 : 7 and the total annual income of A and C is Rs. 800000, then the monthly salary of B (In Rs.) Is :
 (a) 20000 (b) 25000
 (c) 30000 (d) 15000
- 207.** Annual incomes of Amit and Veer are the ratio 3 : 2, while the ratio of their expenditure is 5 : 3. If at the end of the year each saves Rs. 1,000. The annual income of Amit is:
 (a) Rs. 9,000 (b) Rs. 8,000
 (c) Rs. 7,000 (d) Rs. 6,000
- 208.** The ratio of the income of A and B as well as of B and C is 3 : 2. If one third of A's income exceeds one fourth of C's income by 3000, what is B's income in Rs. ?
 (a) 3000 (b) 2500
 (c) 3500 (d) 4000
- 209.** The price of a refrigerator and a television set are in the ratio 5 : 3. If the refrigerator costs Rs. 5500 more than the television set, then the price of the refrigerator is :
 (a) Rs. 27500 (b) Rs. 8250
 (c) Rs. 13750 (d) Rs. 16500
- 210.** The ratio of successful and unsuccessful examinees in an examination in a school is 6 : 1. The ratio would have been 9 : 1 if 6 more examinees had been successful. The total number of examinees is:
 (a) 140 (b) 120
 (c) 200 (d) 160
- 211.** A box filled with paper bundles weights 36 kg. If the weight of the box and paper bundles respectively are in the ratio of 3 : 2 then the weight of paper (in grams) is:
 (a) 30680 grams (b) 30710 grams
 (c) 31500 grams (d) 31680 grams
- 212.** Two numbers are such that the square of one is 224 less than 8 times the square of the other. If the numbers are in the ratio of 3 : 4, then their values are :
 (a) 12, 16 (b) 6, 8
 (c) 9, 12 (d) 12, 9
- 213.** If A : B is 2 : 3, B : C is 6 : 11, then A : B : C is:
 (a) 2 : 3 : 11 (b) 4 : 6 : 22 (c) 4 : 6 : 11 (d) 2 : 6 : 11
- 214.** If two-third of A is four-fifth of B, then A : B = ?
 (a) 5 : 6 (b) 6 : 5
 (c) 10 : 9 (d) 9 : 10
- 215.** If (a + b) : (b + c) : (c + a) = 6 : 7 : 8 and (a + b + c) = 14, then the value of c is:
 (a) 6 (b) 7
 (c) 8 (d) 14
- 216.** If 5.5 of a = 0.65 of b, then a : b is equal to :

- (a) 13: 11 (b) 11 : 13
(c) 13:110 (d) 110:13
- 217.** The ratio of boys and girls in a college is 5 : 3. If 50 boys leave the college and 50 girls join the college, the ratio becomes 9 : 7. The number of boys in the college is :
(a) 300 (b) 450
(c) 500 (d) 600
- 218.** A person distributes his pens among four friends A, B, C, D in $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$. What is the ratio minimum number of pens that the person should have?
(a) 57 (b) 65
(c) 75 (d) 45
- 219.** If $A = \frac{2}{3}$ of B and $B = \frac{4}{5}$ of C, then A:B:C is.
(a) 12:8: 10 (b) 15: 10 : 8
(c) 10: 15 : 12 (d) 8 : 12 : 15
- 220.** The ratio of $25^{2.5} : 5^3$ is same as
(a) 5 : 3 (b) 5 : 6
(c) 1 : 25 (d) 25 : 1
- 221.** The third proportional of 12 and 18 is: (a) 3
(b) 6
(c) 27 (d) 144
- 222.** If x runs are scored by A, y runs by B and z runs by C, then $x : y = y : z = 3 : 2$. scored by A, B and C is 342, the runs scored by each respectively.
(a) 144,96, 64 (b) 162,108,72
(c) 180,120, 80 (d) 189, 126,84
- 223.** If $A : B = 3 : 4$ and $B : C = 6 : 5$, then $C : A$ is:
(a) 10 : 9
(c) 8 : 9 (b) 9:10 (d) 9 : 8
- 224.** Find two mean proportional between 2 and 54,
(a) 6 and 18 (b) 6 and 12
(c) 12 and 18 (d) 6 and 9
- 225.** A man ordered 4 pairs of black socks and some pairs of brown socks. The price of a pair of black socks is double that of a brown pair. While preparing the bill the clerk interchanged the number of black and brown pairs by mistake which increased the bill by 50%. The ratio of the number of black and brown pairs of socks in the original order was :
(a) 2 : 1 (b) 1 : 4
(c) 1 : 2 (d) 4 : 1
- 226.** The ratio of two boys is 5 : 6. After two years the ratio will be 7 : 8. The ratio of their are after 12 years will be:
(a) 22/24 (b) 15/16
(c) 17/18 (d) 11/12
- 227.** The present age of two persons are 36 and 50 years respectively. If after n years the ratio of their age will be 3 : 4, then the value of n is:
(a) 4 (b) 7
(c) 6 (d) 3
- 228.** Of three positive numbers, the ratio of 1st and 2nd is 8 : 9, that of 2nd and 3rd is 3 : 4. The product of 1st and 3rd is 2400. The sum of the three numbers is:
(a) 145 (b) 185
(c) 295 (d) 155
- 229.** The ratio of number of balls in bags x, y is 2 : 3. Five balls are taken from bag y and are dropped in bag number of balls are equal in each bag now, Number of balls in each bag now is:
(a) 45 (b) 20
(c) 30 (d) 25
- 230.** If the square of the sum of two numbers is equal to 4 times of their product, then the ratio of these numbers is:
(a) 2:1 (b) 1 : 3
(c) 1: 1 (d) 1 : 2
- 231.** Three numbers are in the ratio 2 : 3 : 4. If the sum of their squares is 1856, then the numbers are:
(a) 8, 12 and 24 (b) 16, 24 and 32
(c) 12, 18 and 24 (d) None of these.
- 232.** Three numbers are in the ratio 1 : 2 : 3. By adding 5 to each of them, the new numbers are in the ratio 2 : 3 : 4. The numbers are:
(a) 10,20,30 (b) 15,30,45
(c) 1,2,3 (d) 5,10,15
- 233.** Ram got twice as many marks' in English as in Science, His total marks in English, Science and Maths are 180. If the ratio of his marks in English and Maths is 2 : 3, . what is his marks in Science?
(a) 30 (b) 60
(c) 72 (d) 90
- 234.** The ratio in which a man must mix rice at Rs. 10.20 per kg and Rs. 14.40 per kg so as to make a mixture worth Rs. 12.60 per kg, is:
(a) 4: 3 (b) 2 : 5
(c) 18: 24 (d) 3 : 4
- 235.** The proportion of acid and water in three samples is 2 : i, 3 : 2 and 2 5 : 3, A mixture containing equal quantities of all three samples is made. The ratio of acid and water in the mixture is:
(a) 12: 133
(c) 3:8 (b) 227 : 133 (d) 5:11
- 236.** Two alloys are both made up of copper and tin. The ratio of copper and 23. tin in the first alloy is 1 : 3 and in the second alloy is 2 : 5. In what ratio should the two alloys be mixed to obtain a new alloy in which the ratio of tin and copper be 8: 3 ?
(a) 3 : 5 (b) 4: 7
(c) 3 : 8 (d) 5: 11
- 237.** A mixture contains alcohol and water in the ratio 4 : 3, If 5 litres of water is added to the mixtures the ratio becomes 4 : 5. The quantity of alcohol in the given mixture is :
(a) 3 litres (b) 4 litres
(c) 15 litres (d) 10 litres
- 238.** In two alloys A and B, the ratio of zinc to tin is 5 : 2 and 3 : 4 respectively. 7 kg. of the alloy A and 21 kg. of the

- alloy B are mixed together to form a new alloy. What will be the ratio of zinc and tin in the new alloy?
 (a) 2 : 1 (b) 1 : 2
 (c) 2 : 3 (d) 1 : 1
- 239.** Zinc and copper are in the ratio 5 : 3 in 400 gm of an alloy. How much of copper (in grams) should be added to make the ratio 5 : 4 ?
 (a) 50 gm (b) 66 gm
 (c) 72 gm (d) 200 gm
- 240.** A person bought some rice and wheat for Rs. 380. The ratio of weight of rice and wheat is 4 : 3 and the price of equal amount of rice and wheat is in the ratio 5 : 6. The rice was bought of worth
 (a) Rs. 380
 (c) Rs. 200 (b) Rs. 300 (d) Rs. 180
- 241.** The ratio of monthly incomes of A and B is 6 : 5 and their monthly expenditures are in the ratio of 4 : 3. If each of them saves Rs. 400 per month, find the sum of their monthly incomes,
 (a) 2300 (b) 2400
 (c) 2200 (d) 2500
- 242.** There are 480 coins of half rupees, quarter rupees and 10 paise coins and their values are proportional to 5 : 3 : 1. The number of coins in each case are:
 (a) 100,290, 180 (b) 50,30,400
 (c) 150, 180, 150 (d) 300,90,90
- 243.** A box contains 420 coins of 1 rupee 50 paise and 20 paise coins, The ratio of their values is 13 : 11 : 7. The number of 50 paise coins is:
 (a) 42 (b) 78
 (c) 66 (d) 132
- 244.** A box contains Rs. 56 in the form of coins of one rupee, 50 paise and 25 paise. The number of 50 paise coins is double the number of 25 paise coins and four times the number of one rupee coins. How many 50 paise coins are there in the box?
 (a) 52 (b) 64
 (c) 32 (d) 16
- 245.** Rs. 738 is divided among A, B, C so that their shares are in the ratio of 2 : 3 : 4. B's share is :
 (a) Rs. 328 (b) Rs. 246
 (c) Rs. 264 (d) Rs. 164
- 246.** 1740 is divided among A, B, and C such that 0.5 of A = 0.6 of B = 0.75 of C. Then C will get
 (a) Rs. 580 (b) Rs. 696
 (c) Rs. 348 (d) Rs. 464
- 247.** A sum of Rs. 53 is divided among A, B and C in such a way that A gets Rs. 7 more than what B gets and B gets Rs. 8 more than what C gets. The ratio of their share is:
 (a) 16:9 : 18 (b) 25: 18 : 10
 (c) 18: 25 : 10 (d) 15: 8 : 30
- 248.** Rs. 700 is divided among A, B, C in such a way that the ratio of the amount of A and B is 2 : 3 and that of B and C is 4 : 5. Find the amount (in ₹) each received, in the order A, B, C,
 (a) 150,250,300 (b) 160,240,300
 (c) 150,250,290 (d) 150,240,310
- 249.** Divide Rs. 2600 among A,B,C in the ratio $1/2 : 1/3 : 1/4$. Find the share of each.
 (a) Rs. 1,200, Rs. 600, Rs. 800 (b) Rs. 1,200, Rs. 800, Rs.600
 (c) Rs. 600, Rs. 800, Rs.1,200 (d) Rs. 800, Rs. 600, Rs. 1,200
- 250.** A sum of ₹ 300 is divided among P,Q and R in such a way that Q gets ₹ 30 more than P and R gets ₹. 60 more than Q. The ratio of their share is :
 (a) 5 : 3 : 2 (b) 2 : 3 : 5
 (c) 3:2: 5 (d) 2 : 5 : 3
- 251.** Rs. 900 is divided among A, B, C, the division is such that $1/2$ of A's money $1/3$ of B's money = $1/4$ of C's money. Find the amount (in ₹.) received by A, B, C.
 (a) 300,400,200 (b) 350,450,100
 (c) 200,300,400 (d) 400,150,350
- 252.** If Rs. 126.50 is divided among A,B, and C in the ratio of 2 : 5 : 4, the share of B exceeds that of A by
 (a) Rs. 36.50 (b) Rs. 35.50
 (c) Rs. 34.5 (d) Rs. 33.50
- 253.** A sum of Rs. 76 is divided among A, B and C in such a way that A gets Rs. 7 more than B gets and B gets Rs. 6 more than what C gets. the ratio of their share
 (a) 19 : 24 : 33 (b) 32 : 25 : 19
 (c) 32: 24 : 20 (d) 19: 25 : 33
- 254.** Rs. 3000 is divided between A,B and C so that A receives $1/3$ as much as B and C together receive and B receives $2/3$ as much as A and C together receive than. then the share of C is:
 (a) 600 (b) 525
 (c) 1625 (d) 1025
- 255.** Which of the following represents a correct proportion?
 (a) 12: 9:16 :: 12 (b) 13: 11 :: 5: 4 (b) 30: 45::13 : 24 (d) 3 : 5 :: 2: 5
- 256.** If 8, x and 50 are in continued proportion, then the value of x is:
 (a) 30 (b) 20
 (c) 5 (d) 32
- 257.** If A : B = 7 : 9 and B : C = 3 : 5 then A : B : C is equal to:
 (a) 7 : 9 : 5 (b) 21: 35 : 45
 (c) 7: 9 : 15 (d) 7 : 3 : 15
- 258.** The ratio of the length of a school ground to its width is 5 : 2. If the width is 40 m, then the length is :
 (a) 200m (b) 100m
 (c) 50 m (d) 80 m
- 259.** The ratio of the ages of two persons is 4 : 7 and the age of one of them is greater than that of the other by 30 years. the sum of their ages (in years) is:
 (a) 110 (b) 100
 (c) 700 (d) 40
- 260.** The sum of the numbers is equal to 20 and the difference is 25. The ratio of the two number is:

- (a) - 9 : 1 (b) - 7 : 9
(c) 3 : 5 (d) 2 : 7
- 261.** What number should be subtracted from both terms of the ratio 11 : 15 so as to make it as 2 : 3 ?
(a) 2 (b) 3
(c) 4 (d) 5
- 262.** There are two containers of equal capacity. The ratio of milk to water in the first container is 3 : 1 and in the second container is 5 : 2. If they are mixed up, the ratio of milk to water in the mixture will be:
(a) 28 : 41
(c) 15 : 41 (b) 41 : 28 (d) 41 : 15
- 263.** Two equal glasses filled with alcohol and water in the proportions 2 : 1 and 3:2 are emptied into a third glass. The proportion of alcohol and water in the third glass will be:
(a) 13 : 17 (b) 19 : 17
(c) 13 : 11 (d) 19 : 11
- 264.** A box contains 280 coins of one rupee, 50-paise and 25- paise. The values of each of the coins are in the 8 : 4 : 3. Then the number of 50 paise coins is:
(a) 70 (b) 60
(c) 80 (d) 90
- 265.** Rs. 555 was to be divided among A, B and C in the ratio of $\frac{1}{4} : \frac{1}{5} : \frac{1}{6}$. But by mistake it was divided in the ratio 4 : 5 : 6, The amount in excess received by C was:
(a) Rs. 72 (b) Rs. 75
(c) Rs. 22 (d) Rs. 52
- 266.** A man divides his property so that his son's share to his wife's and wife's share to his daughter's are both as in the ratio 3 : 1. If the daughter gets R 10,000 less than son, the value (in rupees) of the whole property is:
(a) Rs. 16,250 (b) Rs. 16,000
(c) Rs. 18,250 (d) Rs. 17,000
- 267.** A policeman starts to chase a thief. When the thief goes 10 steps the policeman moves 8 steps and 5 steps of the policeman are equal to 7 steps of the thief. The ratio of the speeds of the policeman and the thief is:
(a) 25 : 28 (b) 25 : 26
(c) 28 : 25 (d) 56 : 25
- 268.** Tom is chasing Jerry. In the same interval of time Tom jumps 8 times while Jerry jumps 6 times. But the distance covered by Tom in 7 jumps is equal to the distance covered by Jerry in 5 jumps. The ratio of speed of Tom and Jerry is :
(a) 48 : 35 (b) 28 : 15
(c) 24 : 20 (d) 20 : 21
- 269.** If A and B are in the ratio 4 : 5 and the difference of their squares is 81, what is the value of A ?
(a) 36 (b) 445
(c) 15 (d) 12
- 270.** What must be added to each term of the ratio 2 : 5 so that it may equal to 5 : 6 ?
(a) 12 (b) 13
(c) 65 (d) 78
- 271.** Two alloys contain tin and iron in the ratio of 1 : 2 and 2 : 3. If the two alloys are mixed in the proportion of 3 : 4 respectively (by weight), the ratio of tin and iron in the newly formed alloy is:
(a) 14 : 25 (b) 10 : 21
(c) 12 : 23 (d) 13 : 22
- 272.** If two number are in the ratio 2 : 3 and the Ratio becomes 3 : 4 when 8 is added to both the number, then the ratio of two number is:
(a) 90 (b) 50
(c) 60 (d) 40
- 273.** If $x/y = \frac{3}{4}$, the ratio of $(2x + 3y)$ and $(3y - 2x)$ is:
(a) 2 : 1 (b) 3 : 2
(c) 3 : 1 (d) 1 : 1
- 274.** Incomes of x and y are in the ratio 4 : 3. Their expenditures are in the ratio 12 : 7, Both save Rs. 3200 at the end of the month, then the income of x is ?
(a) Rs. 4000 (b) Rs. 6000
(c) Rs. 8000 (d) Rs. 2000
- 275.** A and B have their monthly incomes in the ratio 8:5 while their monthly expenditures are in the ratio 5 : 3, If they have saved Rs. 12,000 and Rs. 10,000 monthly respectively, then the difference in their monthly income is:
(a) 42000 (b) 52000
(c) 46000 (d) 4000
- 276.** In a school there were 1554 students and the ratio of the number of the boys and girls was 4 : 3. After few days, 30 girls joined the school but few boys left: as a result the ratio of the boys and girls became 7 : 6. the number of boys who left the school is:
(a) 76 (b) 84
(c) 86 (d) 74
- 277.** If $(x^3 - y^3) : (x^2 + xy + y^2) = 5:1$ and $(x^2 - y^2) : (x - y) = 7 : 1$, then the ratio equals :
(a) 3 : 2 (b) 2 : 3
(c) 4 : 3 (d) 4 : 1
- 278.** If $A : B = \frac{1}{2} : \frac{1}{3}$, $B : C = \frac{1}{6} : \frac{1}{3}$ then $(A + B) : (B + C)$ is equal to:
(a) 5 : 8 (b) 15 : 16
(c) 9 : 10 (d) 6 : 15
- 279.** In a library the ratio of story books and other books is 7 : 2 and there are 1512 story books. Due to collection of some more story books the said ratio becomes 15 : 4. The number of story books collected is:
(a) 108 (b) 205
(c) 100 (d) 97
- 280.** 2 kg mixture of copper and aluminium, 30% is copper. How much aluminium powder should be added the mixture so that the quantity of copper becomes 20%?
(a) 900 gms (b) 800 gms
(c) 1000 gms (d) 1200 gms

281. A bag contains coins of Rs. 1, 50 paise and 25 paise in the ratio 2 : 3 : 5. If the total value of these coins is Rs. 228, then the number of 50 paise coins in that bag was:
 (a) 144 (b) 124
 (c) 112 (d) 96
282. Divide 27 into two parts so that 5 times the first and 11 times the second together equals to 195. Then ratio of the first and second parts is:
 (a) 3 : 2 (b) 17 : 10
 (c) 2 : 7 (d) 5 : 4
283. A mixture contains milk and water in the ratio 5 : 1. On adding 5 litres of water, the ratio of milk and water becomes 5:2. The quantity of milk in the mixture is:
 (a) 16 litres (b) 25 litres
 (c) 32.5 litres (d) 22.75 litres
284. The sides of a triangle are in the ratio of 7:9:12. The difference between the lengths of largest and smallest sides is 15 cm. The length of the largest sides would be:
 (a) 36 cm (b) 12 cm
 (c) 60 cm (d) 24 cm
285. The three successive angles of a cyclic quadrilateral are in the ratio 1:3:4, find the measure of the fourth angle?
 (a) 72° (b) 30°
 (c) 36° (d) 108°
286. The current ages of Sonali and Monali are in the ratio 5 : 3. Five years from now, their ages will be in the ratio 10 : 7 Then, Monali current age is:
 (a) 3 years (b) 5 years
 (c) 9 years (d) 15 years
287. If $A : B = 2 : 1$ & $A : C = 1 : 3$, then $A : B : C$ is :
 (a) 2 : 1 : 6 (b) 1 : 3 : 2
 (c) 1 : 2 : 6 (d) 3 : 2 : 1
288. Two numbers are in ratio 5 : 8, If their difference is 48, then the smallest numbers is:
 (a) 64 (b) 80
 (c) 96 (d) 128
289. If $a/b = 7/9$, $b/c = 3/5$, then the value of $a:b:c$ is:
 (a) 7 : 3 : 15 (b) 7 : 9 : 15
 (c) 7 : 9 : 5 (d) 21 : 35 : 45
290. If $a:b = 4:5$, $b:c = 5:6$, and $c:d = 6:7$, then $a:c$ is:
 (a) 5 : 6 (b) 3 : 4
 (c) 2:3 (d) 4 : 5
291. If $a/b = c/d = 5$, then $\frac{2a+4c}{3b+4d}$ equal to :
 (a) 5 (b) 20
 (c) 60 (d) 15
292. If $x : y = 3 : 5$ and $x - y = - 2$, then the value of $x : y$ is:
 (a) 8 (b) 2
 (c) 3 (d) 5
- 19 c 20 d 21 a 22 c 23 d 24 a
 25 b 26 d 27 a 28 c 29 c 30 c
 31 a 32 c 33 d 34 d 35 a 36 a
 37 b 38 b 39 b 40 c 41 c 42 d
 43 c 44 b 45 b 46 a 47 d 48 a
 49 a 50 c 51 a 52 b 53 a 54 d
 55 c 56 a 57 d 58 b 59 c 60 c
 61 a 62 d 63 d 64 a 65 b 66 c
 67 b 68 c 69 c 70 d 71 c 72 b
 73 a 74 a 75 d 76 c 77 d 78 d
 79 d 80 a 81 c 82 d 83 a 84 c
 85 b 86 b 87 b 88 a 89 a 90 c
 91 c 92 b 93 a 94 c 95 b 96 c
 97 d 98 d 99 d 100 a 101 a 102 d
 103 c 104 a 105 c 106 d 107 b 108 b
 109 b 110 b 111 b 112 a 113 b 114 a
 115 b 116 d 117 d 118 d 119 c 120 c
 121 c 122 c 123 a 124 a 125 d 126 d
 127 c 128 c 129 a 130 c 131 b 132 c
 133 c 134 d 135 a 136 c 137 b 138 d
 139 c 140 a 141 b 142 c 143 a 144 c
 145 c 146 c 147 a 148 d 149 d 150 b
 151 b 152 d 153 a 154 b 155 d 156 b
 157 c 158 b 159 d 160 d 161 c 162 c
 163 d 164 c 165 a 166 c 167 b 168 c
 169 c 170 c 171 c 172 a 173 b 174 a
 175 d 176 b 177 a 178 a 179 c 180 b
 181 a 182 d 183 b 184 c 185 c 186 a
 187 a 188 a 189 c 190 a 191 b 192 d
 193 a 194 d 195 c 196 c 197 b 198 a
 199 c 200 a 201 c 202 d 203 b 204 c
 205 c 206 b 207 d 208 a 209 c 210 a
 211 d 212 b 213 c 214 b 215 a 216 c
 217 c 218 a 219 d 220 d 221 c 222 b
 223 a 224 a 225 b 226 c 227 c 228 a
 229 d 230 c 231 b 232 d 233 a 234 d
 235 b 236 b 237 d 238 d 239 a 240 d
 241 c 242 c 243 d 244 b 245 b 246 d
 247 b 248 b 249 b 250 b 251 c 252 c
 253 b 254 d 255 a 256 b 257 c 258 b
 259 a 260 a 261 b 262 d 263 d 264 c
 265 a 266 a 267 c 268 d 269 d 270 b
 271 d 272 d 273 c 274 c 275 a 276 a
 277 d 278 b 279 a 280 c 281 a 282 b
 283 b 284 a 285 a 286 c 287 a 288 b
 289 b 290 c 291 a 292 a

ANSWER :

- 1 a 2 c 3 c 4 b 5 c 6 b
 7 d 8 b 9 c 10 d 11 a 12 c
 13 a 14 c 15 c 16 c 17 c 18 c

Detailed solutions

1. (a) $a : b$ and $b : c$
 7 : 9 5 : 7

$$\Rightarrow a : b$$

$$\begin{array}{c} \swarrow \searrow \\ b : c \end{array}$$

$$\Rightarrow a : b : c$$

$$7 : 9$$

$$\frac{5 : 7}{35 : 45 : 63}$$

$$\Rightarrow a : c$$

$$35 : 63$$

$$5 : 9$$

2. (c) $x = \frac{1}{3}y$ and $y = \frac{1}{2}z$

$3x = y$ and $2y = z$

$x : y \quad y : z$
 $1 : 3 \quad 1 : 2$

$x : y : z$

$1 : 3$

$$\begin{array}{c} \swarrow \searrow \\ 1 : 2 \end{array}$$

1 : 3 : 6

3. (c) A : B

$3x : 8x$

Given, $8x - 3x = 115$

$5x = 115$

$x = 23$

\therefore smaller number

$= 23 \times 3 = 69$

$$\begin{array}{c} 3 : 8 \\ \text{5 units} \end{array}$$

Alternate :

5 units = 115

1 unit = 23

3 units = $23 \times 3 = 69$

4. (b) A : B : C : D

$1 : 2 : 3 : 4$

$x + 2x + 3x + 4x = 16$

$10x = 16$

$x = \frac{16}{10}$

$\Rightarrow A + D \Rightarrow x + 4x = 5x$

$= 5 \times \frac{16}{10} \Rightarrow 8$

5. (c) A : B

Before 2 : 1

After 1 : 1

\Rightarrow A gives B two rupees

$\Rightarrow \therefore \frac{21}{9+y} \rightarrow \frac{3}{7}$

$2x - 2 = x + 2$

$x \Rightarrow 4$

$\Rightarrow A = 2 \times 4 = 8$

$B = 1 \times 4 \Rightarrow 8$

6. (b) 1 Rs. : 50 p : 25 p
 $2 : 3 : 4$

$\Rightarrow 2x : 3x : 4x - \text{coins}$

$1 \times 2x : \frac{3x}{2} : \frac{4x}{4} - \text{rupees}$

$\Rightarrow \frac{4x+3x+2x}{2} = 180$

$\Rightarrow \frac{9x}{2} = 180$

$x = 40$

\therefore number of coins of (50 p)

$\Rightarrow 40 \times 3 = 120$

7. (d) A : B : C

$\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

Original ratio

$\Rightarrow \frac{1}{2} \times 12 : \frac{1}{3} \times 12 : \frac{1}{4} \times 12$

$\Rightarrow 6 : 4 : 3$

$6x + 4x + 3x = 117$

$x \Rightarrow \frac{117}{13} = 9$

$A = 9 \times 6 = 54$

$B = 9 \times 4 = 36$

$C = 9 \times 3 = 27$

(original)

But A : B : C

$2 : 3 : 4$ (Erroneous ratio)

$2x + 3x + 4x = 117$

$9x = 117$

$x = 13$

$\therefore A = 13 \times 2 = 26$ (by mistake)

$B = 13 \times 3 = 29$ money

$C = 13 \times 4 = 52$ distributed

\therefore C gains most

$52 - 27 \Rightarrow 25$

8. (b) $A = \frac{2}{9}B$ and $C = \frac{3}{4}A$

$\therefore 9A = 2B \quad 4C = 3A$

A : B and C : A

$2 : 9 \quad 3 : 4$

B : A : C

$9 : 2$

$$\begin{array}{c} \swarrow \searrow \\ 4 : 3 \end{array}$$

$\Rightarrow 36 : 3 : 6$

$18 : 4 : 3$

$\Rightarrow 18x + 4x + 3x = 1250$

$x = 50$

$\Rightarrow A = 4 \times 50 = 200$

$B = 18 \times 50 = 900$

$C = 3 \times 50 = 150$

9. (c) p : q r : s t : 4

$$\begin{aligned}
 & 2:3 \quad 2:3 \quad 2:3 \\
 \Rightarrow & \frac{p}{q} = \frac{r}{s} = \frac{t}{u} = \frac{2}{3} \\
 \Rightarrow & \text{Let } p = 2x \quad q = 3x \\
 & r = 2x \quad s = 3x \\
 & t = 2x \quad u = 3x \\
 \therefore & \frac{mp+nr+ot}{mq+ns+ou} \\
 \Rightarrow & \frac{2xm+2xn+2xo}{3xm+3xn+3xo} \\
 = & \frac{m \cdot 2x + n \cdot 2x + o \cdot 2x}{m \cdot 3x + n \cdot 3x + o \cdot 3x} \\
 = & \frac{2x(m+n+o)}{3x(m+n+o)} = \frac{2}{3}
 \end{aligned}$$

10. (d) $a:b=c:d=e:f$
 $1:2 \quad 1:2 \quad 1:2$

$$\begin{aligned}
 \frac{a}{b} &= \frac{c}{d} = \frac{e}{f} = \frac{1}{2} \\
 \text{Let } a &= x, c = x, e = x \\
 b &= 2x, d = 2x, f = 2x \\
 \therefore & \frac{pa+qc+re}{pb+qd+rf} \\
 \Rightarrow & \frac{x[+xq+xr]}{2xp+2xq+2xr} \\
 = & \frac{x(p+q+r)}{2x(p+q+r)} \Rightarrow
 \end{aligned}$$

11. (a) $x:y = 3:1$
 $\therefore \frac{x}{y} = \frac{3}{1}$

$$\begin{aligned}
 \therefore \frac{x^3-y^3}{x^3+y^3} &\Rightarrow \frac{y^3\left(\frac{x^3}{y^3}-1\right)}{y^3\left(\frac{x^3}{y^3}+1\right)} \\
 &= \frac{\left(\frac{x^3}{y^3}-1\right)}{\left(\frac{x^3}{y^3}+1\right)}
 \end{aligned}$$

Taking y^3 common
 $\Rightarrow \frac{27-1}{27+1} \Rightarrow \frac{26}{28} = \frac{13}{14}$

12. (c) 12, 21, 8, x
 $12:21::8:x$
 For the proportional
 $= 12 \times x = 21 \times 8$
 $x = \frac{21 \times 8}{12} \Rightarrow 14$

$a:B::c:d$
 (d) ← Fourth proportional
 $a \times d = b \times c$
 # $a:b::b:c$
 (c) ← Third proportional
 $b^2 = a \times c$

13. (a) $2^{1.5} : 2^{0.5}$

$$\begin{aligned}
 & 2^{3/2} : 2^{1/2} \\
 \frac{2^{3/2}}{2^{1/2}} &\Rightarrow \frac{2^1}{1} = \frac{2}{1}
 \end{aligned}$$

14. (c) $m:n = 3:2$

$$\begin{aligned}
 \frac{m}{n} &= \frac{3}{2} \\
 &= (4m+5m) = (4m-5n) \\
 \Rightarrow \frac{4m+5n}{4m-5n} &\Rightarrow \frac{n\left(4\frac{m}{n}+5\right)}{n\left(4\frac{m}{n}-5\right)} \\
 \Rightarrow \frac{4 \times \frac{3}{2} + 5}{4 \times \frac{3}{2} - 5} &\Rightarrow \frac{6+5}{6-5} \Rightarrow \frac{11}{1}
 \end{aligned}$$

15. (c) $A+B = 40$

$$\begin{aligned}
 A-B &= 4 \\
 \therefore A &= 22 \\
 B &= 18 \\
 A:B &= 22:18 = 11:9
 \end{aligned}$$

16. (c) $A:B:C$

$$\begin{aligned}
 & 2:1 \\
 & \swarrow \searrow \\
 & 4:1 \\
 & \boxed{8:4:1}
 \end{aligned}$$

17. (c) each exterior angle of a n sided

polygon is $= \left(\frac{360}{n}\right)$
 and each internal angle of n sided polygon
 $= \frac{(n-2) \times 180}{n}$
 $\frac{(n-2) \times 180}{\frac{360}{n}} = \frac{2}{1}$
 $\frac{(n-2)}{2} = 2$
 $n-2 = 4$
 $n = 6$

18. (c) $\frac{6-x}{7-x} < \frac{16}{21}$

$$\begin{aligned}
 126 - 21x &< 112 - 16x \\
 126 - 112 &< 21x - 16x \\
 14 &< 5x \\
 \frac{14}{5} &< x \\
 2.8 &< x \\
 x &= 3(\text{from option})
 \end{aligned}$$

19. (c) son : Daughter : nephew

$$\begin{aligned}
 S &: D : N \\
 D:N &: S:N \\
 4:1 &: 5:1 \\
 \therefore 4x : 1x &: 5x \\
 \therefore 5 \text{ son} &= 5x \times 5 = 25x
 \end{aligned}$$

4 Daughter = $4x \times 4 = 16x$
 2 nephew = $x \times 2 = 2x$
 $\Rightarrow 25x + 16x + 2x = 43x$
 (total money)
 $43x = 8600$
 $x = 200$
 \therefore each daughter = 200×4
 = 800 Rs.

20. (d) A : B B : C C : D
 $3 : 4$ $5 : 7$ $8 : 9$
 $\frac{A}{B} = \frac{3}{4}$ $\frac{B}{C} = \frac{5}{7}$ $\frac{C}{D} = \frac{8}{9}$
 $\therefore \frac{A}{B} \times \frac{B}{C} \times \frac{C}{D} = \frac{3}{4} \times \frac{5}{7} \times \frac{8}{9}$
 $\frac{A}{D} = \frac{10}{21}$

A : D = 10 : 21

21. (a) Harsha = 40
 Ritu = 60
 $\frac{\text{Harsha}}{\text{Ritu}} = \frac{40}{60}$

\therefore let x years ago their ages ratio

Was 3 : 5

$$\Rightarrow \frac{40-x}{60-x} = \frac{3}{5}$$

$$200 - x = 180 - 3x$$

$$2x = 20$$

$$x = 10$$

Or

Harsha : Ritu

Now $\rightarrow 40 : 60$

Before $\rightarrow 3 \times 10 : 5 \times 10$

The difference between ages always remains same, so multiply by 10 in The before ratio.

So,

Now $40 : 60$
 Before $30 : 50$

$$60 - 50 = 10 \text{ years}$$

22. (c) $B_1 : B_2$
 Present $1_{\times 2} : 2_{\times 2}$

5 years Back $1 : 3$

The difference between ages always remains same, so multiply by 2 in present ratio

$B_1 : B_2$
 Present $2 : 4$
 5 years Back $1 : 3$
 1 unit = 5 years
 Ages of B_1 and B_2 after 5 years
 $(2+1) : (4+1)$
 $3 : 5$

23. (d) A : B
 4 years ago $2_{\times 2} : 3_{\times 2}$
 4 years after $5 : 7$

The difference between ages always remains same, so multiply By 2 in 4 years ago ratio

A : B
 4 years ago $\rightarrow 4 : 6$
 4 years after $\rightarrow 5 : 7$

1 unit = 8 year

Ages of A and B after 4 years are

$$A = 5 \times 8 = 40 \text{ years.}$$

$$B = 7 \times 8 = 56 \text{ years.}$$

Hence, Present ages of A & B = 36, 52

24. (a) A : B = 10 : 7
 $10x - 7x = 105$
 $3x = 105$

$$\therefore \text{sum} \Rightarrow A + B$$

$$10x + 7x = 17x$$

$$17 \times 35 \Rightarrow 595$$

Alternate : -

Ratio = $10 : 7$
 3 unit $\rightarrow 105$
 1 unit $\rightarrow 35$

Sum of numbers
 = $10+7 = 17$ units
 = $17 \times 35 = 595$

25. (b) A : B
 $9 : 7$
 $9x : 7x$
 $9x \times 7x = 1575$ given

$$63x^2 = 1575$$

$$x^2 = \frac{1575}{63} \Rightarrow 25$$

$$x = 5$$

\therefore smaller number

$$= 5 \times 7 = 35$$

Largest number

$$= 5 \times 9 = 45$$

26. (d) $a : b = 5 : 7$

Now reducing 40 from each

$$\frac{5x-40}{7x-40} = \frac{17}{27}$$

$$\Rightarrow 135x - 1080 = 119x - 680$$

$$\Rightarrow 135x - 119x = -680 + 1080$$

$$= 16x \Rightarrow 400$$

$$x = \frac{400}{16} \Rightarrow 25$$

$$\text{Difference} = A - B \Rightarrow 7x - 5x =$$

$$2x = 2 \times 25 = 50$$

27. (a) Boys : Girls = 13 : 11

$$\therefore 13x + 11x = 504$$

$$24x \Rightarrow 504$$

$$x = 21$$

\therefore number of Boys

$$= 21 \times 13 = 273$$

Number of Girls

$$= 11 \times 21 = 231$$

Now 12 more girls admitted

$$231 + 12 \Rightarrow 243$$

\therefore Boys : Girls

$$273 : 243$$

$$\Rightarrow 91 : 81$$

28. (c) A : B

$\frac{3}{2} : \frac{8}{3}$ (take L.C.M of denominator and multiply)

$$\Rightarrow \frac{3}{2} \times 6 : \frac{8}{3} \times 6$$

$$= 9x : 16x$$

After adding 15 in each we get

$$\therefore \frac{9x+15}{16x+15} \Rightarrow \frac{5}{3} \times \frac{2}{5} = \frac{2}{3}$$

= cross multiply

$$27x + 45$$

$$\Rightarrow 32x + 30$$

$$\Rightarrow 5x = 15$$

$$x = 3$$

\therefore smaller number

$$= 9 \times 3 = 27$$

Greatest number

$$= 16 \times 3 = 48$$

29. (c) A : B : C

$$\left(\left(\left(2 : 3 : 5 \right) \right) \right) \text{—originally}$$

$$2 \quad 2 \quad 2$$

4 : 5 : 7 — after adding 40 student in each class

$$2 \text{ units} = 40$$

$$1 \text{ unit} = 20$$

\therefore originally

$$A : B : C$$

$$2 \times 20 + 3 \times 20 + 5 \times 20$$

$$40 + 60 + 100 = 200 \text{ students.}$$

30. (c) A : B : C

$$\text{originally } 2 : 3 : 5$$

$$\text{after adding } 4 : 5 : 7$$

20 student in each class

$$2 \text{ unit} = 20$$

$$1 \text{ unit} = 10$$

\therefore originally

$$2 \times 10 + 3 \times 10 + 5 \times 10$$

$$20 + 30 + 50 = 100$$

31. (a) Zinc : Coper

$$5 : 3$$

$$5x : 3x$$

$$8x = 200$$

$$x = \frac{200}{8} = 25$$

$$\text{Zinc} = 5x = 5 \times 25 = 125 \text{ gm.}$$

$$\text{Coper} = 3x = 3 \times 25 = 75 \text{ gm.}$$

\Rightarrow after adding x gram coper ratio becomes 3 : 5

$$\therefore \frac{125}{75+x} = \frac{3}{5}$$

$$625 = 225 + 3x, 400 = 3x$$

$$x = \frac{400}{3} = 133 \frac{1}{3} \text{ gm.}$$

32. (c) Coper : Zinc

$$13 : 7$$

$$13x + 7x = 100 \text{ kg}$$

$$20x = 100$$

$$x = 5 \text{ kg}$$

$$\text{Zinc} = 7 \times 5 = 35 \text{ kg}$$

\therefore Zinc is 35 kg

33. (d) acid : water = 2x : 3x

$$5x : 30 \text{ given}$$

$$x = 6$$

acid = $6 \times 2 = 12$

water = $3 \times 6 = 18$

∴ Let x gram of water added to make it 2 : 5

$$\therefore \frac{2}{5} \sim \frac{12}{18+x}$$

$60 = 36 + 2x$

$24 = 2x$

$x = 12$ ltr

ALTERNATE :-

	Acid : water	
Same	$\left(\begin{array}{c} 2 : 3 \\ 2 : 5 \end{array} \right) \times 2$	

Total = $2+3 = 5$ unit = 30 ltr.

1 unit = 6 ltr.

2 units = $6 \times 2 = 12$ ltr.(water)

34. (d) Income = Expenditure = saving

	A	:	B
Income	$5x$:	$6x$
Expenditure	$3y$:	$4y$
Saving	1800	:	1600

$$\therefore \frac{5x-1800}{6x-1600} = \frac{3y}{4y} = \frac{3}{4}$$

$20x - 7200 = 18x - 4800$

$2x = 2400$

$x = 1200$

∴ income of B = $1200 \times 6 = 7200$

35. (a)

	A	:	B
Income	5	:	6
Expenditure	9	:	5
Saving	1300	:	900

$$\Rightarrow \frac{5x-1300}{3x-900} \sim \frac{9}{5}$$

$\Rightarrow 25x - 6500 = 27x - 8100$

$2x = 1600$

$x = 800$

⇒ Incomes of A & B are

$A = 5x = 5 \times 800 = 4000$ Rs.

$B = 3x = 3 \times 2400 = 7200$ Rs.

36. (a)

A : B	B : C
5 : 2	7 : 13

A : B : C

5 : 2

∴ 7 : 13

35 : 14 : 26

⇒ $35x + 14x + 26x \Rightarrow 75x$

$75x = 7500$

$x = 100$

$B \Rightarrow 14 \times 100 = 1400$ Rs.

37. (b)

A : B	B : C
6 : 5	10 : 9

A : B : C

6 : 5

10 : 9

60 : 50 : 45

12 : 10 : 9

⇒ $12x + 10x + 9x \Rightarrow 31x$

$31x = 1240$

$x = 40$

∴ Share of C = $9 \times 40 = 360$

38. (b)

$A + B = 158$
$C = 158 - 101 = 57$ Rs.(given)
$B = 57 + 13 = 80$ Rs.

∴ $A = 158 - 80 = 78$ Rs.

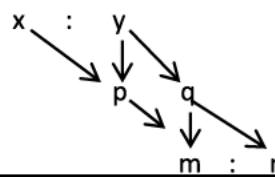
39. (b)

$a : b = \frac{2}{9} : \frac{1}{3} = 2 : 3$

⇒ $b : c = \frac{2}{7} : \frac{5}{14} = 4 : 5$

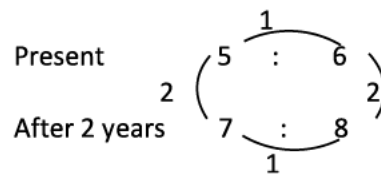
⇒ $d : c = \frac{?}{10} : \frac{3}{5} = 7 : 6$

⇒ A : B : C : D



40. (c)

	B_1	:	B_2
--	-------	---	-------



2 units = 2 years

1 unit = 1 year

∴ Present ages

$B_1 : 5 \times 1 = 5$ years

$B_2 : 6 \times 1 = 6$ years

∴ after 12 years

$B_1 : B_2$

5+12 6+12

17 : 18

$\frac{B_1}{B_2} = \frac{17}{18}$

$\frac{B_2}{B_1} = \frac{18}{17}$

41. (c) A : B : C
 3 : 2 : 5
 3x : 2x : 5x
 $\therefore A^2 + B^2 + C^2 = (3x)^2 + (2x)^2 + (5x)^2$
 $9x^2 + 4x^2 + 25x^2 = 38x^2$
 $\Rightarrow 38x^2 = 1862$
 $x^2 = \frac{1862}{38} \Rightarrow \frac{93}{19} \Rightarrow 49$
 $x = 7$
 $\therefore A = 3 \times 7 = 21$
 $B = 2 \times 7 = 14$
 $C = 5 \times 7 = 35$
 Hence, smallest is 14

42. (d) A + B + C = 116
 A : B : C
 9 : 16
 1 : 4
 16 : 36 : 64
 $\therefore 16x + 36x + 64x = 116$
 $116x = 116$
 $x = 1$
 $\therefore B = 36x = 36 \times 1 = 36$

43. (c) A + B + C = 98
 $\Rightarrow A : B : C$
 2 : 3 : 8
 10 : 15 : 24
 $10x + 15x + 24x = 49x$
 $49x = 98$
 $x = 2$
 $\therefore 2^{\text{nd}}$ number (B)
 $2 \times 15 = 30$

44. (b) A : B
 5x : 7x
 $\therefore \frac{5x-9}{7x-9} = \frac{7}{11}$ (cross multiply)
 $\therefore 55x - 99 = 49x - 63$
 $\Rightarrow 6x = 36 \Rightarrow x = 6$
 Difference = $7x - 5x = 2x$
 $= 2 \times 6 = 12$
 Alternate :

A : B A : B A : B
 $\frac{2}{5 : 7} \Rightarrow 5 \times 2 : 7 \times 2 \Rightarrow 10 : 14$

7 : 11 7 : 11 7 : 11
 4
 $\therefore 3 \text{ unit} = 9$
 1 unit = 3
 $\therefore B - A = 14 - 10 = 4 \text{ units}$
 $= 4 \times 3 = 12$

45. (b) A : B = 3 : 5
 $\frac{3x-9}{5x-9} = \frac{12}{23}$
 $\Rightarrow 69x - 207 = 60x - 108$
 $69x - 60x = 207 - 108$
 $9x = 99 \Rightarrow x = 11$
 \therefore smaller no. is
 $3 \times 11 = 33$
 Alternate :

A : B A : B A : B
 Initially $\frac{3}{5}$
 $\Rightarrow 3 \times 11 : 5 \times 11 \Rightarrow 33 : 55$
 New $\frac{12}{23}$
 $12 \times 2 : 23 \times 2 \Rightarrow 24 : 46$
 11

\therefore Number are 33, 55.
 Hence, smaller is 33

46. (a) copper : zinc
 5 : 2
 5x : 2x
 $5x + 2x = 17 \frac{1}{2} \text{ kg} \Rightarrow 7x = \frac{35}{2} \text{ kg}$
 $\Rightarrow x = \frac{5}{2} \text{ kg}$
 \therefore copper
 $\Rightarrow 5x \times \frac{5}{2} = \frac{25}{2} \text{ kg}$
 Zinc $\Rightarrow 2x \times \frac{5}{2} = 5 \text{ kg}$

Now, after adding 1.250 kg zinc
 \Rightarrow zinc become
 $\Rightarrow 5 + 1.250 = 6.250 \text{ kg}$
 $= 6 \frac{1}{4} = \frac{25}{4}$

\therefore New ratio becomes
 Copper : Zinc = $\frac{25}{2} : \frac{25}{4}$
 $= 2 : 1$

47. (d) spirit : water
 3x : 2x
 $x = 3 \text{ liter}$
 \therefore Spirit = $3 \times 3 = 9 \text{ liters}$

48. (a) milk : water
7 : 3

$$7x + 3x = 10x$$

$$10x = 30 \text{ liter}$$

$$x = 3 \text{ liter}$$

$$\text{Milk} = 7 \times 3 = 21$$

$$\text{Water} = 3 \times 3 = 9$$

∴ let water be added y liters

$$\text{So, } \frac{21}{9+y} = \frac{3}{7}$$

$$147 = 27 + 3y$$

$$3y = 147 - 27$$

$$3y = 120$$

$$y = 40 \text{ liter}$$

49. (a) Let, income of A, B and C are 7x, 9x and 12x respectively
⇒ and expenditure of A, B and C are 8y, 9y and 15y respectively

⇒ income of

$$A \times \frac{1}{4} = \text{saving A (given)}$$

$$\Rightarrow 7x - 8y = 7x \times \frac{1}{4}$$

$$\Rightarrow 28x - 32y = 7x$$

$$\Rightarrow 21x = 32y$$

$$\Rightarrow 32 : 21$$

∴ The ratio of saving of A, B and C

$$\Rightarrow (7x - 8y) : (9x - 9y) : (12x - 15y)$$

$$(7 \times 32 - 8 \times 21) : (9 \times 32 - 9 \times 21)$$

$$\Rightarrow (12 \times 32 - 15 \times 21)$$

$$(224 - 168) : (288 - 189) : (384 - 315)$$

$$56 : 99 : 69$$

50. (c) 1 unit = 600 Rs.

∴ Income of P = 3 units = 3 × 6000 = 18000

$$\frac{3x - 6000}{4x - 6000} = \frac{2}{3}$$

$$\Rightarrow 9x - 18000 = 8x - 12000$$

$$\Rightarrow x = 6000$$

∴ income of P = 3x = 3 × 6000 = 18000 Rs.

51. (a) Total coins = 378

Ratio of values → 13 : 11 : 7
In Rs. 1, no. of Rs. 1 coins = 1
In Rs. 1, no. of 50 p coins = 2
In Rs. 1, no. of 25 p coins = 4
Ratio of Rs. 1, 50 p, 25 p coins
= 1 : 11 × 2 : 7 × 4
= 1 : 22 : 28
= $\frac{22}{13+22+28} \times 378 = 132$

52. (b) Total rupees = 90 Rs.

$$\Rightarrow 50p : 25p : 10paise$$

$$\text{Coins } 2x : 3x : 5x$$

$$\text{Values } \frac{2x}{2} : \frac{3x}{4} : \frac{5x}{10}$$

$$\therefore \frac{2x}{2} + \frac{3x}{4} + \frac{5x}{10} = 90$$

$$\frac{40x + 30x + 20x}{40} = 90$$

$$90x = 3600$$

$$x = \frac{3600}{90} = 40$$

∴ 25 paise coins are 25 = 40 × 3 = 120

53. (a) A : B : C : D = 3400

$$A : B : C : D$$

$$2 : 3$$

$$4 : 3$$

$$2 : 3$$

$$16 : 24 : 18 : 27$$

$$\Rightarrow 16 : 24 : 18 : 27$$

$$16x + 24x + 18x + 27x = 3400$$

$$85x = 3400$$

$$x = \frac{3400}{85} \Rightarrow 40$$

∴ share of B + D is = 24x + 27x = 51x
= 51 × 40 = 2040 Rs.

54. (d) $\frac{A}{B} = \frac{B}{C} = \frac{3}{4}$

$$A : B : C$$

$$3 : 4$$

$$3 : 4$$

$$\boxed{9 : 12 : 16}$$

$$9x + 12x + 16x = 370$$

$$= 37x = 370$$

$$x = 10$$

A's share is

$$= 9 \times 10 = 90$$

55. (c) A : B

$$17 : 45$$

$$17x : 45x \text{ (given)}$$

$$\Rightarrow 17x \times \frac{1}{3} + 15 = 45x \times \frac{1}{5}$$

$$\Rightarrow \frac{17x + 45}{3} \Rightarrow 9x$$

$$17x + 45 = 27x$$

$$10x = 45$$

$$x = \frac{45}{10}$$

∴ smaller number

$$\frac{45}{10} \times 17 = \frac{165}{10} = 76\frac{1}{2}$$

56. (a) A : B : C
 $\frac{1}{2} : \frac{1}{3} : \frac{1}{5}$
 Take LCM of 2,3, 5 = 30
 A : B : C
 $\frac{1}{2} \times 30 : \frac{1}{3} \times 30 : \frac{1}{5} \times 30$
 $\boxed{15 : 10 : 6}$
 $\therefore 15x + 10x + 6x = 6200$
 $\Rightarrow 31x = 6200$
 $X = 200$
 $A = 15 \times 200 = 3000$
 $B = 10 \times 200 = 2000$
 $C = 6 \times 200 = 1200$

57. (d) milk : water
 2 : 1
 $2x + x = 45$
 $X = 15$
 $\therefore \text{milk} = 2 \times 15 = 30 \text{ liter}$
 $\text{Water} = 1 \times 15 = 15 \text{ liter}$
 $\Rightarrow \frac{30}{15+x} \times \frac{1}{2}$
 $60 = 15 + x$
 $X = 45 \text{ liter}$

Alternate :-

M : W	M : W	M : W	M : W
2 : 1	2 : 1	2 : 1	2 : 1

$\left. \begin{matrix} 2 : 1 \\ 2 : 1 \\ 2 : 1 \end{matrix} \right\} \times 2$
 New Ratio 1 : 2 : 2 : 2 : 4

Because quantity of milk is same in both cases. So, we multiplied by 2 to make quantity of milk same in both ratio.

Previous quantity
 $= 2+1 = 3 \text{ units} = 45 \text{ ltr.}$
 $1 \text{ unit} = 15 \text{ ltr.}$

\therefore quantity of water added = 3 units, From above diagram

\therefore Quantity of water added = $3 \times 15 = 45 \text{ ltr.}$

58. (b) Wine : Water
 Initially 3 : 1
 Finally 1 : 1

Now, we have to substitute the mixture with water so, the quantity of mixture remains same

\therefore Wine : Water
 Initially 3 : 1 = 4

Finally $\left(\begin{matrix} 1 : 1 \\ 2 : 2 \end{matrix} \right)_{\times 2} = 4$

Now, we have to add water so, we have to equalize wine proportion

Wine : Water Wine : Water
 $(3 : 1)_{\times 2} \quad 6 : 2$
 $(2 : 2)_{\times 3} \quad 6 : 6$
 $\left. \begin{matrix} 6 : 2 \\ 6 : 6 \end{matrix} \right\} \times 4 \Rightarrow \text{quantity of mixtures}$

Required Part = $\frac{4}{12} = \frac{1}{3}$

59. (c) Income \Rightarrow expenditure + saving
 Now given
 Expenditure : saving
 $26x : 3x$
 $\therefore \text{Income} = 26x + 3x = 29x$
 $29x = 7250$
 $X \Rightarrow \frac{7250}{29} \Rightarrow 250$

$\therefore \text{savings} = 250 \times 3 = 750$

60. (c) Rs. 1 : 50 paise : 25 paise
 No. of coins $8x : 5x : 3x$

Value of coins $\frac{8x}{1} : \frac{5x}{2} : \frac{3x}{4}$
 $\therefore 8x + \frac{5x}{2} + \frac{3x}{4} = 225 \text{ Rs.}$

Given $\frac{32x + 10x + 3x}{4} = 225$

$45x = 225 \times 4$

$X \Rightarrow \frac{225 \times 4}{45} = 5 \times 4 = 20$

\therefore no. of one rupees coins = $20 \times 8 = 160$

61. (a) A : B : C
 5 : 2
 7 : 13

$\boxed{35 : 14 : 26}$

$35x + 14x + 26x = 75x = 750$

$X = 10$

\therefore A's share = $35x = 35 \times 10 = 350 \text{ Rs.}$

62. (d) P : Q : R = 2 : 7 : 9
 $P + Q = R$ (given)

$2x + 7x = 9x$

Here we don't have sufficient data to insure the values of A, B & C

63. (d) A : B B : C C : D
 3 : 4 , 5 : 7 , 8 : 9

$\frac{A}{B} = \frac{3}{4}, \frac{B}{C} = \frac{5}{7}, \frac{C}{D} = \frac{8}{9}$

$\frac{A}{B} \times \frac{B}{C} \times \frac{C}{D} = \frac{3}{4} \times \frac{5}{7} \times \frac{8}{9}$

$\Rightarrow \frac{10}{21}$

A : D = 10 : 21

64. (a) $A + B = 94$
 Given $\frac{A}{5} : \frac{B}{8} = 3 : 4$
 $\Rightarrow \frac{A \times 8}{5 \times B} = \frac{3}{4}$
 $\frac{A}{B} = \frac{3}{4} \times \frac{5}{8} = \frac{15}{32}$
 A : B

15 : 32
 $15x + 32x = 47x$
 $47x = 94$
 $x = 2$

$\therefore A = 15 \times 2 = 30$
 $B = 32 \times 2 = 64$

65. (b) a : b c : d
 5 : 7 2a : 3b
 $\frac{a}{b} = \frac{5}{7}, \frac{c}{d} = \frac{2a}{3b} = \frac{2}{3} \times \frac{5}{7} = \frac{10}{21}$
 $ac : bd = \frac{ac}{bd} = \frac{5}{7} \times \frac{10}{21}$
 $\frac{50}{174} = 50 : 174$

66. (c) $x : y = 3 : 2$
 $\frac{x}{y} = \frac{3}{2}, \frac{2x^2 + 3y^2}{3x^2 - 2y^2}$
 $= \frac{y^2(2\frac{x^2}{y^2} + 3)}{y^2(3\frac{x^2}{y^2} - 2)} = \frac{2 \times \frac{9}{4} + 3}{3 \times \frac{9}{4} - 2} = \frac{\frac{9}{2} + 3}{\frac{27}{4} - 2}$
 $= \frac{15 \times 4}{2 \times 19} = \frac{30}{19}$

67. (b) a : b = b : C
 $\frac{a}{b} = \frac{b}{c}$
 $b^2 = ac$
 $b^4 = a^2 c^2$
 $a^4 : b^4 = \frac{a^4}{b^4} = \frac{a^4}{a^2 c^2} \frac{a^2}{c^2}$
 $a^2 : c^2$

68. (c) $A : B = \frac{1}{2} : \frac{3}{8} \quad \frac{A}{B} = \frac{4}{3}$
 $B : C = \frac{1}{3} : \frac{5}{9} \quad \frac{B}{C} = \frac{1}{3} \times \frac{9}{5} = \frac{3}{5}$
 $C : D = \frac{5}{6} : \frac{3}{4} \quad \frac{C}{D} = \frac{5 \times 4}{6 \times 3} = \frac{10}{9}$
 A : B : C : D

4 : 3
 3 : 5
 10 : 9

$\square A : B : C : D$
 8 : 6 : 10 : 9

69. (c) $A : B : C = 2 : 3 : 4$
 Let
 $A = 2x, B = 3x, C = 4x$
 $\therefore \frac{A}{B} : \frac{B}{C} : \frac{C}{A} = \frac{2x}{3x} : \frac{3x}{4x} : \frac{4x}{2x}$
 $\Rightarrow \frac{2}{3} : \frac{3}{4} : \frac{2}{1}$

Multiply by the L.C.M of denominator to remove fraction.

So, L.C.M of (3,4,1) = 12
 $\therefore \frac{A}{B} : \frac{B}{C} : \frac{C}{A}$
 $\frac{2}{3} \times 12 : \frac{3}{4} \times 12 : \frac{2}{1} \times 12$
 8 : 9 : 24

70. (d) a : b = 1 : 2
 C : d = 1 : 2
 e : f = 1 : 2
 $\therefore a = x \quad c = x \quad e = x$
 $b = 2x \quad d = 2x \quad f = 2x$
 $\therefore \frac{3 \times x + 5 \times x + 7 \times x}{3 \times 2x + 5 \times 2x + 7 \times 2x}$
 $\Rightarrow \frac{15x}{30x} = \frac{1}{2}$

71. (c) $B_1 : B_2 \quad B_1 : B_2 \quad B_1$
 $: B_2$
 5 years back $\overset{2}{1 : 3} \quad 1_{\times 11} : 3_{\times 11} \quad 1$
 $: 3$
 \Rightarrow
 1
 Present age $\overset{1}{1 : 2} \quad 1_{\times 2} : 2_{\times 2} \quad 2$
 $: 4$

1 unit = 5 years
 Present age of $B_1 = 2$ units = $2 \times 5 = 10$ years
 Present age of $B_2 = 4$ units = $4 \times 5 = 20$ years
 \therefore 5 years after ages will be

$B_1 = 10 + 5 = 15$
 $B_2 = 20 + 5 = 25$
 $B_1 : B_2$
 15 : 25
 $\square 3 : 5$

72. (b) Puneet : Appu

Present age 2 : 3

After 3 Years 3 : 4

1 unit = 3 years

∴ present age of Puneet = 2×3 = 6 years

Present age of Appu = 3×3 = 9 years

Alternate : $\frac{2x+3}{3x+3} = \frac{3}{4}$

∴ 8x + 12 = 9x + 9

x = 3

∴ Puneet = 2x = 2×3 = 6

Appu = 3x = 3×3 = 9

73. (a) A : B : C

8 : 9

3 : 4

8 : 9 : 12

8x : 9x : 12x

∴ 8x × 12x = 2400

$x^2 \Rightarrow \frac{2400}{12 \times 8}$

x = 5

∴ B ⇒ 9×5 = 45

74. (a) A : B = 2x : 3x

Now, $\frac{2x-2}{3x+2} = \frac{1}{2}$

4x - 4 = 3x + 2

X ⇒ 6

∴ A = 2×6 = 12

B = 3×6 = 18

Sum of no. = A+B

= 12+18 = 30

75. (d) A : B : C

$\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$

∴ $\frac{1}{2} \times 12 : \frac{2}{3} \times 12 : \frac{3}{4} \times 12$

6 : 8 : 9

6x : 8x : 9x

9x - 6x = 3x

3x = 36

X = 12

∴ Numbers are

⇒ A = 6×12 = 72

⇒ B = 8×12 = 96

⇒ C = 9×12 = 108

76. (C) A : B : C

Initially 2 : 3 : 5

After adding 20 students 4 : 5 : 7

In each class 2 unit = 20

1 = 10

Initially students are

= 2×10+3×10+5×10

= 20+30+50 ⇒ 100

77. (d) take ratio = $\frac{1 \rightarrow \text{water}}{3 \rightarrow \text{milk}}$

Milk Initially	Finally milk
3	2
<u>3</u>	<u>2</u>
9 = 81	4
9	
36	

∴ milk 6

Water 81-36 = 45

∴ milk : water

36 : 45

4 : 5

Alternate :

Final milk = Initial milk

$(1 - \frac{\text{milk taken out}}{\text{initial milk}})^n$

=

$81 \left(1 - \frac{27}{81}\right)^2$

$81 \left(1 - \frac{1}{3}\right)^2$

= $81 \times \frac{2}{3} \times \frac{2}{3} = 36$

Final water

= 81 - 36 = 45

Required ratio

= $\frac{36}{45} = \frac{4}{5}$

78. (d) milk : water

7 : 3

2 : 1

⇒ Now water is added so, the milk proportion remains same

For this

Milk : Water

Initially (7 : 3)_{×2}

Finally $(2 : 1)_{\times 7}$

= milk : water

$$\boxed{14 : 6} = 80 \text{ liter (given)}$$

$$14 : 7$$

1 unit

$\Rightarrow 20 \text{ unit} = 80 \text{ liter}$

1 unit = 4 liter

\therefore water added

= $1 \times 4 = 4 \text{ liter}$

79. (d) $A : B$
 Income $\begin{pmatrix} 4 : 3 \\ (1)(-):(-)(1) \end{pmatrix}$
 Expenditure $\begin{pmatrix} 3 : 2 \\ (1) \quad (1) \end{pmatrix}$
 Saving $\begin{pmatrix} 1 & 1 \\ (x) & (x) \end{pmatrix}$
 600 600

1 unit = 600

\therefore Income of A

= $600 \times 4 = 2400$

B = $600 \times 3 = 1800$

80. (a) Let Incomes of A and B are

$A : B$

Income $5x : 3x$

Expenditure $9y : 5y$

Saving $2600 : 1800$

$$\therefore \frac{5x-2600}{3x-1800} = \frac{9}{5}$$

$$\Rightarrow 25x - 13000 = 27x - 16200$$

$$2x = 16200 - 13000$$

$$2x = 3200$$

$$x = 1600$$

\therefore Income of A = $5x$

= $5 \times 1600 = 8000 \text{ Rs.}$

B = $3x = 3 \times 1600 = 4800 \text{ Rs.}$

81. (c) $A : B$

Income $2x : 3x$

Expenditure $5y : 9y$

Saving $600 : 600$

$$\therefore \frac{2x-600}{3x-600} = \frac{5}{9}$$

$$= 18x - 5400 = 15x - 3000$$

$$3x \Rightarrow 2400$$

$$x = 800$$

\therefore Incomes of A & B are

A = $2x = 2 \times 800 = 1600$

B = $3x = 3 \times 800 = 2400$

82. (d) $A : B : C$
 $\frac{1}{2} : \frac{1}{4} : \frac{5}{16}$
 $\frac{1}{2} \times 16 : \frac{1}{4} \times 16 : \frac{5}{16} \times 16$
 $8 : 4 : 5$

$$8x + 4x + 5x = 68000$$

$$17x = 68000$$

$$x = 4000$$

$$\therefore A = 4000 \times 8 = 32000$$

$$B = 4000 \times 4 = 16000$$

$$C = 5 \times 4000 = 20000$$

Required difference

= 16000 Rs.

83. (a) 1st class : 2nd class

Fare $3 : 1$

Passenger $\times 1 : \times 50$

Total fare $3 + 50 = 53x$

$$53x = 1325$$

$$x = \frac{1325}{53} = 25$$

\therefore Amount collected from 2nd Class = $50x$

$$\therefore 25 \times 50 = \text{Rs. } 1250$$

84. (c) $P : q : r$

$$1 : 2 : 4$$

$$x : 2x : 4x$$

$$\therefore \sqrt{5p^2 + q^2 + r^2}$$

$$= \sqrt{5x^2 + 4x^2 + 16x^2}$$

$$\Rightarrow \sqrt{25x^2} = 5x$$

$$= 5p$$

85. (b) $(3+\sqrt{2}) : x : (12-\sqrt{32})$

$a : b : c$

mean proportion

$$b^2 = a \times c$$

$$x^2 = (3+\sqrt{2}) \times (12-\sqrt{32})$$

$$= (3+\sqrt{2}) \times (12-4\sqrt{2}) = 28$$

$$x = \sqrt{28} = 2\sqrt{7}$$

86. (b) $x : y$

$$2 : 3$$

$$\therefore \frac{x}{y} = \frac{2}{3}$$

$$3x+2y$$

$$9x+5y$$

$$\frac{y\left(\frac{3x}{y}+2\right)}{y\left(\frac{9x}{y}+5\right)} = \left(\frac{3 \times \frac{2}{3} + 2}{9 \times \frac{2}{3} + 2}\right)$$

$$\frac{2+2}{6+5} = \frac{4}{11}$$

87. (b) $a : b : c$

$$3 : 4$$

$$8 : 9$$

$$24 : 32 : 36$$

$$\boxed{6 : 8 : 9}$$

$$a : c$$

$$6 :$$

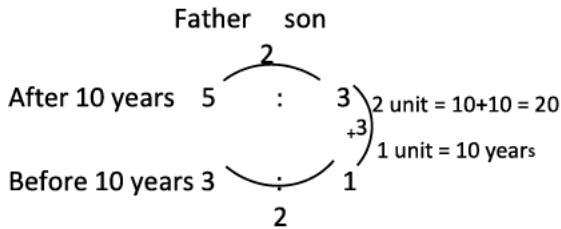
$$\boxed{2 : 3}$$

$$\text{Or } \frac{a}{b} = \frac{3}{4} \quad \frac{b}{c} = \frac{8}{9}$$

$$\frac{a}{b} \times \frac{b}{c} = \frac{3}{4} \times \frac{8}{9}$$

$$\frac{a}{c} \Rightarrow \frac{2}{3}$$

88. (a)



∴ 10 years ago ages

Father : Son
30 : 10

Father = 40

Son = 20

Present age

Father : Son

40 : 20

$\frac{2}{1}$

Son : father

= $\frac{1}{2}$

89. (a) Boys : girls
13 : 11

$$\therefore 13x + 11x = 504$$

$$24x = 504$$

$$x = 21$$

$$\text{Boys} = 21 \times 13 = 273$$

$$\text{Girls} = 21 \times 11 = 231$$

Now,

3 more girls admitted

So,

No. of girls

$$= 231 + 3 = 234$$

∴ new

Boys : Girls

273 : 234

91 : 78

$\frac{7}{6}$

90. (c) ladies : gents

Initially 3 : 2

3x : 2x

$$\frac{3x}{2x+20} \times \frac{2}{3}$$

$$9x = 4x + 40$$

$$5x = 40$$

$$x = 8$$

$$\text{Initially ladies} = 3 \times 8 = 24$$

$$\text{Gents} = 2 \times 8 = 16$$

$$\Rightarrow \text{after gents becomes} = 16 + 20 = 36$$

$$\text{Ladies remains same} = 24$$

91. (c) milk : water

A 4 : 5 9

B 5 : 1 6

5 : 4 9

Take L.C.M of amount 9, 6, 9

$$\text{L.C.M} = 3 \times 3 \times 2 = 18$$

∴ Equalize the amount of all mixtures

Milk : water

$$A (4 : 5)_{\times 2} = 8 : 10$$

$$B (5 : 1)_{\times 3} = 15 : 3$$

$$\text{After mixing } (5 : 4)_{\times 2} = 10 : 8$$

$$\Rightarrow \begin{array}{cc} A & B \\ 8 & 15 \end{array}$$

$$\begin{array}{c} \diagdown \quad \diagup \\ 10 \end{array}$$

$$\# \begin{array}{cc} 5 & : & 2 \end{array}$$

Or

$$\Rightarrow \begin{array}{cc} 10 & 3 \\ \diagdown & \diagup \\ & 8 \end{array}$$

$$\# \begin{array}{cc} 5 & : & 2 \end{array}$$

92. (b) Rs. 1 : Rs. 5 : Rs. 10

No. of notes 1 : 1 : 1

$$x : x : x = 3x \text{ no. of notes}$$

no. of values x : 5x : 10x = 16x values of note

$$x + 5x + 10x \Rightarrow 640$$

$$16x = 640$$

$$x = 40$$

$$\therefore \text{no. of notes} = 40 \times 3 \Rightarrow 120$$

93. (a)

Let Rs. 1 : 50p : 25p

Value of coins $x : x : x$

No. of coins $x : 2x : 4x = 7x$

$$7x = 175$$

$$x = \frac{175}{7} = 25$$

∴ value of total amount

$$= 3x = 25 \times 3 = \text{Rs. } 75$$

94. (c) $a : b : c$
 $2 : 3 : 4$
 Let $2x : 3x : 4x$
 $2a - 3b + 4c = 33$
 $2 \times 2x - 3 \times 3x + 4 \times 4x = 33$
 $4x - 9x + 16x = 33$
 $11x = 33$
 $x = 3$
 $\therefore \Rightarrow 4 \times 3 = 12$

95. (b) $a : b = c : d$
 $\frac{a}{b} = \frac{c}{d}$ and $\frac{a}{c} = \frac{b}{d}$ $\frac{ma+nc}{mb+nd}$
 $= \frac{c(\frac{ma}{c}+n)}{d(\frac{mb}{d}+n)} = \frac{c(m \times \frac{b}{d} + n)}{d(m \times \frac{b}{d} + n)} = \frac{c}{d}$

96. (c) $A : B : C$
 $4 : 5$
 $2 : 3$
 $8 : 10 : 15$
 $8x : 10x : 15x$
 $A = 8x = 800$ given
 $x = 100$
 $\therefore C = 15x = 15 \times 100 = 1500$

97. (d) $a : b : c$
 $7 : 3 : 5$
 $\frac{a+b+c}{2a+b-c} = \frac{7x+3x+5x}{14x+3x-5x}$
 $= \frac{15x}{12x} = \frac{5}{4}$
 $= 5 : 4$

98. (d) $A : B : C$
 $2 : 3$
 $4 : 5$
 $8 : 12 : 15$

99. (d) $2A = 3B = 4C$
 Divide by LCM of 2,3,4 i.e. = 12
 $\frac{2A}{12} = \frac{3B}{12} = \frac{4C}{12}$
 $\frac{A}{6} = \frac{B}{4} = \frac{C}{3}$
 $A : B : C$
 $6 : 4 : 3$

100. (a) $A : B : B : C : C : D$
 $2 : 3, 2 : 4, 2 : 5$
 $\therefore \frac{A}{B} = \frac{2}{3}, \frac{B}{C} = \frac{2}{4}, \frac{C}{D} = \frac{2}{5}$
 $\therefore \frac{A}{B} \times \frac{B}{C} \times \frac{C}{D} = \frac{2}{3} \times \frac{2}{4} \times \frac{2}{5} \Rightarrow \frac{A}{D} = \frac{2}{15}$
 $\Rightarrow A : D = 2 : 15$

101. (a) $A : B : C$

$3 : 7$
 $6 : 5$
 $18 : 42 : 35$
 $18x + 42x + 35x \Rightarrow 95x$
 $95x = 33630$
 $x = 354$

\therefore money received by B = $42x = 42 \times 354 = 14868$
 Note : To save time check unit digit for **example**
 $42 \times 354 =$ unit digit is $2 \times 4 = 8$
 Check option with unit digit 8.

There is only one.
 Option 14868

102. (d) father (f) + son(s) = 100

$F + S = 100$ ----- (i)

$\frac{F-5}{S-5} = \frac{2}{1}$

$(F-5) = 2(S-5)$

$F-5 = 2S-10$

$F-2S = -5$ ----- (ii)

By I & II

$F + S = 100$

$F - 2S = -5$

$\begin{array}{r} + \quad +_{\text{present age}} \\ 3S = 105 \end{array}$

$S = 35$

$F = 100 - 35 = 65$

ratio of age after 10 years

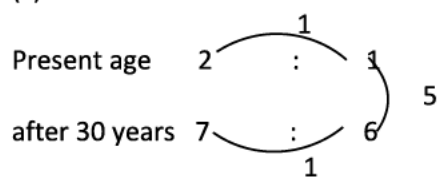
Father : son

$65+10 : 35+10$

$75 : 45$

$5 : 3$

103. (c) Rahul : Rashmi



5 units = 30 years

1 unit = 6 years

Present age of Rahul = $2 \times 6 = 10$ years

104. (a) $A + B + C = 68$

$A : B : C$

$2 : 3$

$\underline{5 : 3}$

$\underline{10 : 15 : 9}$

$10x + 15x + 9x = 34x$

$34x = 68$

$x = 2$

$A = 2 \times 10 = 20$

$B = 2 \times 15 = 30$

$$C = 9 \times 2 = 18$$

105. (c) A : B

$$4 : 5$$

$$4x : 5x$$

$$\text{L C M} = 4 \times 5 \times x = 20x$$

$$20x = 180$$

$$x = 9$$

$$\text{Smallest number is} = 4 \times 9 = 36$$

$$\text{Largest number is} = 5 \times 9 = 45$$

106. (d) Boys : girls

$$8 : 5$$

$$8x : 5x$$

$$8x + 5x = 13x$$

$$13x = 286$$

$$x = 22$$

$$\text{Boys} = 8 \times 22 = 176$$

$$\text{Girls} = 5 \times 22 = 110$$

→ no. of girls at present after adding 22 girls is $110 + 22 = 132$

Boys : girls

$$176 : 132$$

$$44 : 33$$

$$4 : 3$$

107. (b) milk : water

$$17x : 3x$$

$$17x + 3x = 200 \text{ liter}$$

$$20x = 200$$

$$x = 10 \text{ liter}$$

milk : water

$$170 : 30$$

after adding x liter of milk the ratio becomes

Milk : water

$$7 : 1$$

$$\frac{170-x}{30} = \frac{7}{1}$$

$$= 170 + x = 210$$

$$x = 40$$

ALTERNATE :

$$M : W$$

$$\text{Before } 17 : 3$$

$$\text{After } 7 : 1$$

Water is same in both conditions

Make water same in above ratio

$$M : W \quad M : W$$

$$\text{Before } 17 : 3 \quad 17 : 3$$

$$\text{After } 7 \times 3 : 1 \times 3 \quad 21 : 3$$

$$17+3 = 20 \text{ units} \rightarrow 200 \text{ ltr.}$$

$$1 \text{ unit} \rightarrow 10 \text{ ltr.}$$

$$4 \text{ unit} \rightarrow 40 \text{ ltr.}$$

108. (b) Milk : water

$$\text{Initial } 7 : 5$$

$$\text{Final } 7 : 8$$

adding 15 liter water

$$\frac{7x}{5x+15} = \frac{7}{8}$$

$$8x = 5x + 15$$

$$x = \frac{15}{3}$$

$$x = 5$$

at present = milk : water

$$= 7x : 8x$$

$$\text{water} = 8x = 8 \times 5 = 40 \text{ ltr.}$$

109. (b) A : B

$$5 : 6$$

$$5x : 6x$$

$$B - A = 6x - 5x$$

$$x = 11100$$

Total income A + B

$$= 5x + 6x = 11x$$

$$11 \times 11100 = 1,22,100$$

110. (b) Rs. 1 : 50p : 25p

$$\text{no. of coins } 8x : 5x : 3x$$

$$\text{value of coins } 8x : \frac{5x}{2} : \frac{3x}{4}$$

$$8x + \frac{5x}{2} + \frac{3x}{4} = 112.50$$

$$\frac{32x + 10x + 3x}{4} = \frac{11250}{100}$$

$$\frac{45x}{4} = \frac{225}{2}$$

$$x = 10$$

$$50 \text{ paise coins are} = 5x = 5 \times 10 = 50$$

111. (b) Rs. 1 : 50p : 25p

$$\text{no. of coins } 3x : 8x : 20x = 31x$$

$$\text{value of coins } 3x : \frac{8x}{2} : \frac{20x}{4}$$

$$3x + 4x + 5x = 12x$$

$$12x = 372$$

$$x = 31$$

Total no. of coins → 31x

$$= 31 \times 31 = 961$$

112. (a) Given total runs of A, B, C ($A+B+C = 361$)

→ A : B : C

$$3 : 2$$

$$\underline{\quad 3 : 2 \quad}$$

$$\underline{\quad 9 : 6 : 4 \quad}$$

$$9x + 6x + 4x = 361$$

$$19x = 361$$

$$x = 19$$

runs scored by A
 → $9x = 9 \times 19 = 171$

113. (b) Passed student : Failed student

P : F
 25 : 4
 $25x : 4x \rightarrow 29x$ total student

→ $\frac{\text{failure}}{\text{total student}} \rightarrow \frac{4x}{29x}$

After admitting 5 more students,
 Total students

→ $29x + 5$

New failure students

→ $4x - 2$

New ratio →

P : F

$22 : 3 \rightarrow 25y$
 failure

total appeared
 $= \frac{4x-2}{29x+5} = \frac{3y}{25y}$

$100x - 50 = 87x + 15$

→ $13x = 65$

$x = 5$

Total student appeared in the exam was
 $= 29x + 5 = 150$

114. (a)

a : b : c
 3 : 4 : 7
 $3x : 4x : 7x \rightarrow 14x$

$a + b + c = 14x$

$c = 7x$

$(a + b + c) : c$
 $= 14x : 7x = 2 : 1$

115. (b) A : B : C

3 : 4
 ↙ ↘
 12 : 13
 $36 : 48 : 52$
 9 : 12 : 13

A : C = 9 : 13

116. (d) A : B : C

3 : 2
 3 : 4
 $9 : 6 : 8$

A : C = 9 : 8

117. (d) $\frac{2}{3}$ of A = 75% of B = 0.6 of C

→ $\frac{2}{3} A = \frac{75}{100} B = \frac{6}{10} C$

→ $\frac{2}{3} A = \frac{3}{4} B = \frac{3}{5} C$

Multiply L.C.M of (2,3,3) = 6

A : B : C

$\frac{3}{2} \times 6 : \frac{4}{3} \times 6 : \frac{5}{3} \times 6$

A : B : C

9 : 8 : 10

118. (d) A : B : C

3 : 5
 ↙ ↘
 4 : 7
 $= 12 : 20 : 35$

119. (c) milk : water

7 : 1

Let $7x$: x

$7x + x = 8x$

$8x = 40$ liters (given)

$x = 5$

milk = $7 \times 5 = 35$ liter

water = 5 liter

→ Let 'y' liter of water is added

$\frac{35}{5+y} \leftrightarrow \frac{3}{1}$

(Cross multiply)

$35 = 15 + 3y$

$3y = 20$

$y = \frac{20}{3} = 6\frac{2}{3}$ liters

ALTERNATE :

M : W M : W M : W

Before 7 : 1 $7 \times 3 : 1 \times 3$ 21 : 3

After 3 : 1 $3 \times 7 : 1 \times 7$ 21 : 7

NOTE : Milk is same in both condition, so make same value of milk in above ratio.

$21 + 3 = 24$ units = 40 ltr.

1 unit = $\frac{40}{24} = \frac{5}{3}$ ltr.

4 units = $\frac{5}{3} \times 4 = \frac{20}{3} = 6\frac{2}{3}$ ltr.

120. (c) When any quantity of mixture is taken out from the mixture then the ratio of the remaining mixture remains the same = 4 : 1

$$\begin{array}{ccc} A : B & A : B & \\ \text{Initially} \rightarrow 4 : 1 & \rightarrow 4 : 1 & \\ & & \searrow 5 \\ \text{Finally} \rightarrow (2 : 3)_{\times 2} & \rightarrow 4 : 6 & \end{array}$$

Now mixture is taken out and liquid B is added. So, make A proportion Equal.

5 units = 10 ltr.

1 unit = 2 ltr.

Quantity of **solution** = 4+6

= 10 units

= 10×2 = 20 liters

Initially ratio of

A : B

4 : 1

4x + x = 20 ltr.

B = 4×1 = 4 ltr.

121. Milk : Water

2 : 1

2x : x

3x = 75 → x = 25

Milk = 2x = 2×25 = 50 ltr.

Water = x = 25 ltr.

Let y liter of water is added

$$\frac{50}{25+y} = \frac{1}{2}$$

25+y = 100

y = 100-25 = 75 liters

ALTERNATE :

$$\begin{array}{ccc} M : W & M : W & M : W \\ \text{Before} & 2 : 1 & 2 : 1 & 2 : 1 \\ & & & \searrow 3 \\ \text{After} & 1 : 2 & 1_{\times 2} : 2_{\times 2} & 2 : 4 \end{array}$$

NOTE : Milk is same in both condition, so Make value of milk in above ratio.

2+1 = 3 units = 3 ltr.

1 unit = 1 ltr.

75 units = 75 ltr.

122. (c) Gold : Copper LCM

$$A \rightarrow 5 : 3 = 8_{\times 2} = 16 \rightarrow 10 : 6$$

$$B \rightarrow 5 : 11 = 16_{\times 1} = 16 \rightarrow 5 : 11$$

$$\begin{array}{l} \text{Gold : Copper} = (10+5) : (6+11) \\ = 15 : 17 \end{array}$$

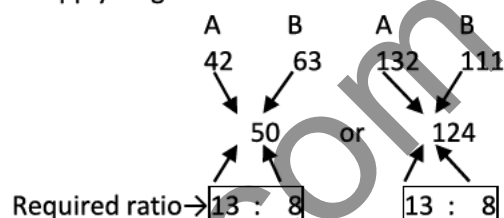
123. (a) Gold : Copper LCM

$$A \ 7 : 22 = 29_{\times 3} = 174 \rightarrow 42 : 132$$

$$B \ 21 : 37 = 58_{\times 3} = 174 \rightarrow 63 : 111$$

$$\text{mixture } 25 : 62 = 87_{\times 2} = 174 \rightarrow 50 : 124$$

apply alligation

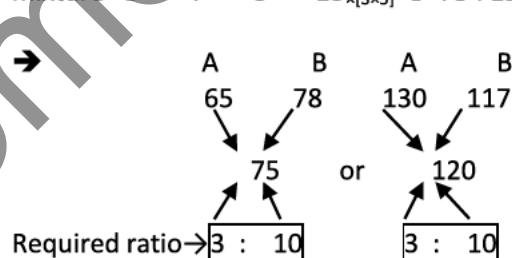


124. (a) Zinc : Copper

$$A \ 1 : 2 = 3_{\times [3 \times 5]} \rightarrow 65 : 130$$

$$B \ 2 : 3 = 5_{\times [3 \times 5]} \rightarrow 78 : 117$$

$$\text{mixture } 5 : 8 = 13_{\times [3 \times 5]} \rightarrow 75 : 120$$



125. (d) 1 Rs. : 50p

values 13x : 11x

coins $\boxed{13x} : \boxed{22x}$

$$13x + 22x = 35x$$

$$35x = 210$$

$$x = \frac{210}{35} = 6$$

→ coins of 1 Rs.

$$= 13x = 13 \times 6 = 78$$

50p coins

$$= 22 \times 6 = 132$$

126. (d)

50p : 25 p : 10p

No. of coins 1x : 32x : 3x

value of coins

in paise x × 50 : 32x × 25 : 3x × 10

$$50x : 800x : 30x$$

$$\rightarrow 50x + 800x + 30x = 880x$$

$$880x = \text{Rs. } 8.80 = 880p$$

$$x = \frac{880}{880} = 1$$

No. of 10 paise coins are

$$= 30x = 30 \times 1 = 30$$

127. (c) A 0 B : C

$$\begin{array}{r}
 1 : 3 : 4 \\
 \text{Let } 100x : 300x : 400x \\
 \downarrow +5\% \quad \downarrow +10\% \quad \downarrow +15\% \\
 \text{Let } 105x : 330x : 460x \\
 105 : 330 : 460 \\
 \mathbf{21 : 66 : 92}
 \end{array}$$

128. (c) Marks in
 → Math + English = 170
 → Math - English = 10
 Math → $\frac{180}{2} = 90$

English → 80
 Math : English
 90 : 80
 9 : 8

129. (a) x : y
 2 : 1
 Let 2x : x
 → $(x^2 - y^2) : (x^2 + y^2)$
 → $\frac{x^2 - y^2}{x^2 + y^2} \rightarrow \frac{4x^2 - x^2}{4x^2 + x^2}$
 → $\frac{3x^2}{5x^2} = \frac{3}{5}$

130. (c) 2A = 3B and 4B = 5C
 A : B B : C
 3 : 2 5 : 4
 A : B : C
 $\begin{array}{r} 3 : 2 \\ \times \quad \times \\ \hline 5 : 4 \end{array}$
 $\begin{array}{r} 15 : 10 : 8 \end{array}$
 A : C
 15 : 8

131. (b) A : B
 2 : 3
 Let 2x : 3x
 A × B → 2x × 3x = 6x²
 6x² = 96
 Given x² = 16
 x = 4

sum of numbers
 = (A + B) = 2x + 3x = 5x = 5 × 4 = 20

132. (c) A : B
 2 : 3
 Let 3x : 4x
 If each no. is increased by 6
 Then, $\frac{3x+6}{4x+6} = \frac{4}{5}$ (given)

15x + 30 = 16x + 24
 x → 6
 A = 6 × 3 = 18
 B = 4 × 6 = 24
 Difference between numbers
 A - B = 24 - 18 = 6

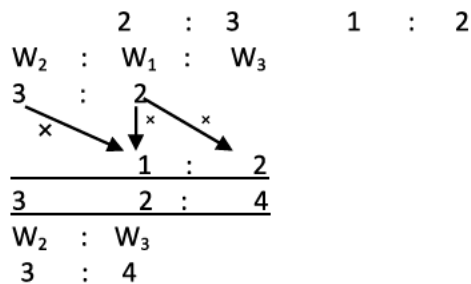
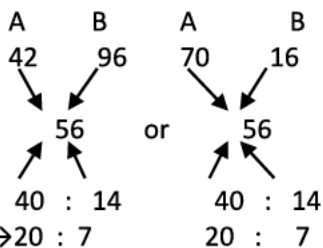
ALTERNATE :
 A : B
 $\begin{array}{r} 3 : 4 \\ \left(\quad \right) 1 \\ 4 : 5 \end{array}$

1 unit = 6
 Difference = (4-3)
 = 1 unit = 6

133. (c) A : B : C
 5 : 6 : 7
 Let 5x : 6x : 7x
 → Product of numbers
 A × B × C = 5x × 6x × 7x = 210 x³
 → 210 x³ = 5670 (given)
 → x³ $\frac{5670}{210} = 27$
 x³ = 27
 x = 3
 A = 5 × 3 = 15
 B = 6 × 3 = 18
 C = 7 × 3 = 21
 Greatest numbers is c
 = 21

134. (d) 6, 7, 15, 17
 if a : b : c : d are in proportion then
 a × d = b × c
 Let x is added to each number
 (6+x) : (7+x) :: (15+x) : (17+x)
 (6+x) × (17+x) = (7+x) × (15+x)
 x² + 23x + 102 = x² + 22x + 105
 → x = 3
NOTE : you can directly go through option to save your Valuable time. (by putting value of x from option)

135. (a)
 Zinc : Copper
 A 3 : 5 = 8_(7×2)
 B 6 : 1 = 7_(2×8)
 C 1 : 1 = 2_(8×7) } → 112 units
 → Milk Water
 A 42 : 70
 B 96 : 16
 C 56 : 56
 → By alligation



136. (c) A : B
Income $4x : 3x$
Expenses $3y : 2y$
Saving 60000
Income \rightarrow Expenses + saving
 $\frac{4x-60000}{3x-60000} = \frac{3}{2}$
 $8x - 120000 = 9x - 180000$
 $x = 60000$
Income of A
 $= 4 \times 60000 = 240000$

137. (b) Mr. : Mrs.
Before $7x : 8x$
After $5y : 6y$
 \rightarrow before $7x+8x = 120$
 $15x = 120$
 $x = 8$

Mr. gupta = $7 \times 8 = 56$
Mrs. Gupta = $8 \times 8 = 64$
after losing 6 kg by Mr. gupta
the ratio be comes 5 : 6
 \rightarrow Let Mrs. Gupta loss x kg

$$\frac{56-6}{64-x} = \frac{5}{6}$$

$$300 = 320 - 5x$$

$$5x = 20$$

$$x = 4 \text{ kg.}$$

138. (d) Ist : IInd
Fare $4x : x$
Passengers 1 : 40
Total fare $4x : 40x = 44x$
 $44x = 1100$
 $x = \frac{1100}{44} = 25$
Fare = Ist class amount received
 $= 4x = 4 \times 25 = 100$

139. (c) A : B
 $3 : 2$
 $3x : 2x$
 $\rightarrow 3x + 2x = 1000$
 $5x = 1000$
 $x = 200$
 $A = 3 \times 200 = 600$

140. (a) $W_1 : W_2$ $W_1 : W_3$

141. (b) $3x = 5y = 4z$
 $x : y : z$
 $5 \times 4 : 4 \times 3 : 5 \times 3$
 $20 : 12 : 15$

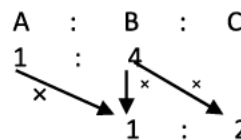
142. (c) A : B B : C
 $3 : 4$ $6 : 5$
A : B : C
 $3 : 4 : 5$
 $18 : 24 : 20$
 $9 : 12 : 10$
 $A + C \rightarrow 9 + 10 = 19$
 $A : A + C = 9 : 19$

143. (a) $a + b\sqrt{3} = \frac{1}{2-\sqrt{3}}$
 $\rightarrow \frac{1}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2+\sqrt{3}} = \frac{2+\sqrt{3}}{4-3}$
 $= 2 + \sqrt{3}$

by rationalization of denominator
 $\rightarrow a + b\sqrt{3} = 2 + \sqrt{3}$
 \rightarrow Now compare the rational & irrational parts
 $a = 2$
 $b = 1$
 $2 : 1$

144. (c) A : B : C
 $3 : 4$
 $24 : 32 : 36$
 $6 : 8 : 9$

145. (c) $A = \frac{1}{4}B$ $4A = B$
B : A
 $4 : 1$
 $B = \frac{1}{2}C$ $2B = C$
B : C
 $1 : 2$



$$\underline{1 \quad 4 \quad : \quad 8}$$

146. (c) $2A = 3B = 4C$
 $A : B : C$
 $3 \times 4 : 2 \times 4 : 2 \times 3$
 $12 : 8 : 6$
 $\underline{6 : 4 : 3}$

147. $4^{3.5} : 2^5 = (2^2)^{3.5} : 2^5 = 2^{2 \times 3.5} : 2^5$
 $= 2^7 : 2^5 = 2^2 \cdot 2 : 2^5 = 2^2 : 1$
 $= 4 : 1$

148. (d) $A : B \quad B : C \quad C : D \quad D : E$
 $1 : 2 \quad 3 : 4 \quad 6 : 9 \quad 12 : 16$

→ $A : B : C$

$$\begin{array}{ccc} 1 & : & 2 \\ & \swarrow & \downarrow \quad \searrow \\ & & 3 & : & 4 \end{array}$$

$$\begin{array}{ccc} 3 & & 6 & : & 8 \end{array}$$

→ $A : B : C : D$

$$\begin{array}{cccc} 3 & : & 6 & : & 8 \\ & \swarrow & \downarrow & \swarrow & \downarrow \\ & & 6 & : & 9 \end{array}$$

$$\begin{array}{cccc} 18 & : & 36 & : & 48 & : & 72 \\ \underline{3} & : & 6 & : & 8 & : & 12 \end{array}$$

$A : B : C : D : E$

$$\begin{array}{cccc} 3 & : & 6 & : & 8 & : & 12 \\ & & & & & & 12 & 16 \\ \hline \rightarrow & 3 & : & 6 & : & 8 & : & 12 & 16 \end{array}$$

149. (d) $x : y$
 $2 : 5$
 Let $2a : 5a$
 $\frac{5x+3y}{5x-3y}$
 $\frac{5 \times 2a + 3 \times 5a}{5 \times 2a - 3 \times 5a}$
 $\rightarrow -\frac{5}{1} = -5$

150. Father : son
 $F : S$
 $5 : 2$
 Let $5x : 2x$
 given, $5x \times 2x = 1000$
 $10x^2 = 1000$
 $x^2 = 100$
 $x = 10$
 Father's present age
 $= 10 \times 5 = 50$
 Son's present age
 $= 2 \times 10 = 20$
 After 10 years
 Age of Father = $50 + 10$

= 60 years
 Age of son = $20 + 10$
 $= 30$ years

151. (b) 6, 14, 18, 38
 If a, b, c, d are in proportion
 → $a : b :: c : d$
 then $ad = bc$
 Let x is added in the sequence
 number as to make it in proportion
 $(6+x) : (14+x) :: (18+x) : (38+x)$
 $(6+x)(38+x) = (18+x)(14+x)$
 Now to save valuable time put
 value of x from options to make it
 proportion
 $(6+x)(38+x) = (18+x)(14+x)$
 → $x^2 + 44x + 228 = x^2 + 32x + 252$
 $12x \rightarrow 252 - 228$
 $12x \rightarrow 24$
 $x \rightarrow 2$ Ans.

152. (d) $A : B$
 $3 : 4$
 Let $3x : 4x$
 LCM of A & B is
 $= 3 \times 4 \times x = 12x$
 $12x = 180$ Given
 $x = 15$

$A = 3x = 3 \times 15 = 45$
 $B = 4x = 4 \times 15 = 60$

153. (a) $A : B$
 $3 : 5$
 Let $3x : 5x$
 LCM of A & B is
 $= 3 \times 5 \times x = 15x$
 $15x = 225$ Given
 $x = 15$
 $A = 15 \times 3 = 45$
 $B = 15 \times 5 = 75$
 Smaller number is = 45

154. (b) $A : B$
 $3 : 4$
 Let $3x : 4x$
 LCM of A & B is = $3 \times 4 \times x = 12x$
 $12x = 48$
 Given
 $x = 4$
 $A = 3 \times 4 = 12$
 $B = 4 \times 4 = 16$
 Sum of numbers
 $A + B = 12 + 16 = 28$

155. (d) $\frac{A}{B} = \frac{7}{11}$ Given
 Let x be added to both A & B

$$\rightarrow \frac{7+x}{11+x} = \frac{3}{4}$$

Cross multiply the equation

$$28+4x = 33+3x$$

$$x = 5$$

156. (b) A : B

$$7 : 11$$

Let $7x : 11x$

Now after adding 7 to each number

$$\rightarrow \frac{7x+7}{11x+7} = \frac{2}{3}$$

$$21x + 21 = 22x + 14$$

$$x = 7$$

$$\rightarrow A = 7 \times 7 = 49$$

$$\rightarrow B = 11 \times 7 = 77$$

Smaller number = 49

157. (b) A : B

$$3 : 5$$

Let $3x : 5x$

Now after adding 10 to each number

$$\rightarrow \frac{A}{B} = \frac{3x+10}{5x+10} = \frac{5}{7}$$

$$21x + 70 = 25x + 50$$

$$4x = 20$$

$$x = 5$$

$$A = 3 \times 5 = 15$$

$$\rightarrow B = 5 \times 5 = 25$$

158. (b) A : B : C

$$2 : 3 : 5$$

Let $2x : 3x : 5x$

$$\rightarrow C - A = 5x - 2x = 3x = 12000$$

$$x = \frac{12000}{3} = 4000$$

Monthly salary of B is

$$= 3x = \text{Rs. } 12000$$

Annual salary of B

$$= 12 \times 12000 = \text{Rs. } 1,44,000$$

159. (d) Income : Expenditure

$$\begin{array}{ccc} I & : & E \\ 11 & : & 10 \end{array}$$

$$11 - 10 = 1 \rightarrow \text{saving}$$

$$1 = 9000$$

annual incomes

$$= 9000 \times 11 = \text{Rs. } 99000$$

Monthly income

$$= \frac{99000}{12} \rightarrow \text{Rs. } 8250$$

160. (d) A : B

$$5 : 3$$

Let $5x : 3x = 8x$

\rightarrow New comers

$$5y : 7y = 12y$$

$$8x + 12y = 1200$$

$$\rightarrow 2x + 3y = 300 \dots (i)$$

again, $\frac{5x+5y}{3x+7y} = \frac{7}{5}$

$$25x + 25y = 21x + 49y$$

$$\rightarrow 4x - 24y = 0$$

$$4x = 24y$$

$$x = 6y \dots (ii)$$

From equation $\dots (i)$

$$12y + 3y = 300$$

$$y = \frac{300}{15} = 20$$

$$x = 120$$

The number of students initially

$$8x = 8 \times 120 = 960$$

161. (c) $\rightarrow x : y : z$

are three persons

Speed $4 : 3 : 5$

Time $\frac{1}{4} : \frac{1}{3} : \frac{1}{5}$

Speed $\propto \frac{1}{\text{Time}}$

LCM of 4, 3 and 5 = 60

time $\frac{1}{4} \times 60 : \frac{1}{3} \times 60 : \frac{1}{5} \times 60$

$$15 : 20 : 12$$

162. (c) P : Q

$$2 : 5$$

Let $2x : 5x$

$$P = 2x = 120 \quad (\text{given})$$

$$x = 60$$

$$\text{marks of Q} = 60 \times 5 = 300$$

163. (d) A : B

$$A : B$$

$$4 : 9$$

$$2 : 3$$

$$B : A : C$$

$$9 : 4$$

$$2 : 3$$

$$\rightarrow 18 : 8 : 12$$

$$(A + B) : (B + C)$$

$$\begin{aligned} \rightarrow (18+8) & : (18+12) \\ 26 & : 30 \\ 13 & : 15 \end{aligned}$$

164. (c) $x : y$
 $3 : 4$

$$\frac{5x+2y}{7x+2y} \rightarrow \frac{y\left(\frac{5x}{y}-2\right)}{y\left(\frac{7x}{y}+2\right)}$$

$$\frac{5 \times \frac{3}{4} - 2}{7 \times \frac{3}{4} + 2} \rightarrow \frac{15-8}{21+8} \rightarrow \frac{7}{29}$$

165. (a) $x : y = 3 : 4$

$$\frac{x}{y} = \frac{3}{4}$$

$$\rightarrow \frac{4x-y}{2x+3y} \rightarrow \frac{y\left(\frac{4x}{y}-1\right)}{y\left(\frac{2x}{y}+3\right)}$$

$$\rightarrow \frac{4 \times \frac{3}{4} - 1}{2 \times \frac{3}{4} + 3} \rightarrow \frac{(3-1) \times 2}{3+6} \rightarrow \frac{4}{9}$$

$4 : 9$

166. (c) Maya : Chhaya

Present age $6 : 5$

$8 - 5 = 3 \text{ units}$

15 years hence $9 : 8$

$3 \text{ units} = 15 \text{ years}$
 $1 \text{ unit} = 5 \text{ years}$

present age

Maya $\rightarrow 6 \times 5 = 30 \text{ years}$

Chhaya $\rightarrow 5 \times 5 = 25 \text{ years}$

167. (b) Ram : Rahim

10 years ago $1 : 3$

5 years hence $2 : 3$

15 years difference

Ram : Rahim

$(1 : 3) \times 1 = 1 : 3$

$(2 : 3) \times 2 = 4 : 6$

$3 \text{ units} \rightarrow 15 \text{ years}$

$1 \text{ unit} \rightarrow 5 \text{ years}$

10 years ago ages of Ram and Rahim are

$= 1 \times 5 = 5 \text{ years}$

$3 \times 5 = 15 \text{ years}$

Present age of Ram

$= 5 + 10 = 15 \text{ years}$

Rahim $= 15 + 10 = 25 \text{ years}$

Ratio of present ages are

$= \text{Ram} : \text{Rahim}$

$15 : 25$

$3 : 5$

168. (c) Let two quantity are A, B

Given, $A + B = 3(A - B)$

$\rightarrow A + B = 3A - 3B$

$\rightarrow A - 3A = -3B - B$

$\rightarrow -2A = -4B$

$A = 2B$

$A : B = 2 : 1$

169. (c) $A : B : C$

$3 : 4 : 5$

Let $3x : 4x : 5x$

Sum of (smallest + largest)

$A + C \rightarrow 8x$

$8x = 4x + 52$

$4x = 52$

$x = 13$

smallest numbers = A

$\rightarrow 13 \times 3 = 39$

170. (c) when any quantity of mixture

is taken out from the mixture

then the ratio of the remaining

mixture remains the same

$A : B$

$7 : 5$

$7 : 9$

Given that 9 liter of mixture is

taken out & 9 liter of B is added.

So, the 'A' part remains constant

Difference between B

$= 5 - 9 = 4$

$4 \text{ units} \rightarrow 9$

$1 \text{ unit} \rightarrow \frac{9}{4}$

total quantity = $A + B \rightarrow 7x + 9x \rightarrow 16x$

$16 \times \frac{9}{4} \rightarrow 36 \text{ liters}$

Initially,

$A : B$

$7 : 5 = 12 = 36 \text{ liters}$

$A = 7 \times 3 = 21 \text{ liters}$

171. (c) $A : B$

Initially $7 : 5$

Finally $7 : 9$

$\rightarrow 9 \text{ liters of mixture is taken out}$

and B is added so, part 'A' remains

same for this multiply by 7 the

new ratio

\rightarrow But quantity of mixture remains same

$A : B$

Before $7 : 5$

$7 - 5 = 2$

New $7 : \underline{\quad}$

2 units

$$2 \text{ units} = 9$$

$$1 \text{ unit} = \frac{9}{2}$$

Quantity of mixture
 = 7+7 = 14 units
 = $14 \times \frac{9}{2} = 63$ liters

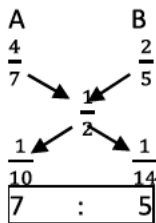
→ Initial ratio of A : B
 7 : 5
 $A = \frac{7}{12} \times 63 = \frac{7 \times 21}{4} = \frac{147}{4} = 36\frac{3}{4}$ liters

172. (a) Milk : water

$$A \quad 4 \quad : \quad 3$$

$$B \quad 2 \quad : \quad 3$$

New mixture 1 : 1



173. (b) water : glycerin

$$1 \quad : \quad 3 = 240 \text{ cc}$$

→ 60 : 180

Let x liter of water added

$$\frac{60+x}{180} = \frac{2}{3}$$

$$180 + 3x = 360$$

$$3x = 180$$

$$x = 60$$

Alternate :

$$W \quad : \quad G$$

$$(1 \quad : \quad 3 = 4 \text{ units})$$

$$(2 \quad : \quad 3)$$

4 units = 240cc

$$1 \text{ unit} = \frac{240}{4} = 60 \text{cc}$$

174. (a) Acid : water

$$4 \quad : \quad 1$$

Let $4x + x = 5x$
 $4x + x = 25$
 $x = 5$

Acid = $5 \times 4 = 20$

Water = $5 \times 1 = 5$

3 liters water is added

So, new quantity of water
 = 5+3 = 8

Acid : Water

$$20 \quad : \quad 8$$

$$5 \quad : \quad 2$$

175. (d) Water : Milk

$$A \quad 3 \quad : \quad 4 = 7 \times 8$$

$$B \quad 5 \quad : \quad 3 = 8 \times 7$$

→ make quantities of A & B equal

→ water : milk

$$A \quad 24 \quad : \quad 32$$

$$B \quad 35 \quad : \quad 21$$

$$\underline{59} \quad : \quad \underline{53}$$

So, ratio of water and milk in new mixture
 = 59 : 53

176. (b) Acid : Water

$$A \quad 4 \quad : \quad 3 = 7 \times (8 \times 5)$$

$$B \quad 5 \quad : \quad 3 \times (7 \times 5)$$

new mixture 168 : 112 = 280

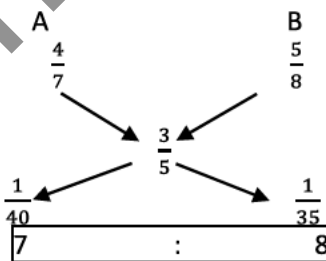
(Acid in mixture) (Acid in mixture)

$$A \quad 160 \quad \quad \quad B \quad 175$$

168 ← Acid in final mixture

$$\boxed{7 \quad : \quad 8}$$

Or



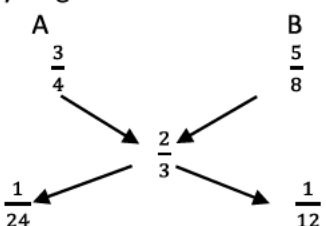
177. (a) Acid : water

$$A \quad 3 \quad : \quad 1$$

$$B \quad 5 \quad : \quad 3$$

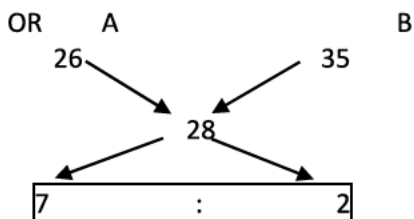
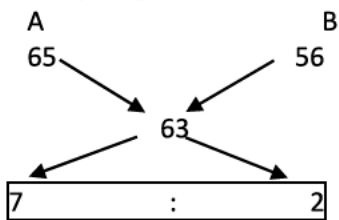
$$C \quad 2 \quad : \quad 1$$

By alligation method



$$\boxed{1} : \boxed{2}$$

- 178.** (a) Acid : water
 A 5 : 2 = 7×13
 B 8 : 5 = 13×7
 New 9 : 4 = 13×7
 Make quantities equal
 Acid : water
 A 65 : 26 = 91
 B 56 : 35 = 91
 New 63 : 28 = 91
 By alligation



- 179.** (C) Spirit : Water
 A 3x : 7x
 $3x + 7x = 20$
 $x = 2$
 Spirit in A = $3 \times 2 = 6$ liters
 Water in A = $7 \times 2 = 14$ liters
 Spirit : Water
 B 7x : 5x
 $7x + 5x = 36$
 $x = 3$
 Spirit in B = $7 \times 3 = 21$ liters
 Water in B = $5 \times 3 = 15$ liters
 Spirit : Water
 $(6+21) : (14+15)$
 27 : 29

- 180.** (b) Copper : Zinc : Nicked
 Old 5 : 3 : 2
 New 5 : 3 : 3
 1 unit
- Now old ratio
 $= 5x + 3x + 2x = 10x$
 $10x = 100 \text{ kg.}$
 $1 \text{ unit} = 10 \text{ kg.}$
 Nickel added to mixture

$= 1 \text{ unit} = 10 \text{ kg.}$

- 181.** (a) Income : Expenditure
 $10x : 7x$
 Saving = Income - expenditure
 $10x - 7x = 3x$
 Given, Expenditure = $7x = 10500$
 $x = 1500$
 Saving = $3x = 3 \times 1500 = 4500$

- 182.** (b) A : B
 Income 9 : 7
 Expense 4 : 3
 Income - Saving = Expenditure
 $\frac{9x-200}{7x-200} = \frac{4}{3}$
 $\rightarrow 27x - 600 = 28x - 800$
 $x = 200$
 Sum of weekly income
 $= 9x + 7x = 16x$
 $16 \times 200 = \text{Rs. } 3200$

- 183.** (d) A : B
 Income 2 : 3
 Expenditure 1 : 2
 Saving $\frac{1}{x} : \frac{1}{x}$
 24000 24000

1 unit = 24000
 Income of A = 2 units
 $= 24000 \times 2 = \text{Rs. } 48000$

ALTERNATE :-
 $\frac{2x-24000}{3x-24000} = \frac{1}{2}$
 $\rightarrow 4x - 48000 = 3x - 24000$
 $\rightarrow x \rightarrow 24000$
 Income of A
 $= 24000 \times 2 = \text{Rs. } 48000$

- 184.** (c) A : B
 Income 9 : 8
 Expenditure 8 : 7
 Saving $\frac{1}{x} : \frac{1}{x}$
 500 500

1 unit = 500
 Income of A = 500×9
 $= \text{Rs. } 4500$

185. (c) Let two number be x and y.

$x < y$

$5\left(x - \frac{x}{2}\right) = \left(y - \frac{x}{2}\right)$

$\rightarrow 5\left(\frac{x}{2}\right) = y - \frac{x}{2}$

$\frac{5x}{2} + \frac{x}{2} = y$

$3x = y$

$x : y$

$1 : 3$

Ratio of larger to smaller

$y : x$

$3 : 1$

186. (a) $A + B = 94$

$\frac{A}{5} : \frac{B}{8} = 3 : 4$

$\frac{A \times 8}{5 \times B} = \frac{3}{4}$

$\frac{A}{B} = \frac{3}{4} \times \frac{5}{8} = \frac{15}{32}$

$A : B$

$15 : 32$

Let $15x : 32x$

$15x + 32x = 47x$

$47x = 94$

$x = 2$

$A = 2 \times 15 = 30$

$B = 32 \times 2 = 64$

187. (a) 0.8, 0.2, x

if a, b, c are three number

these $a : b : c$

$b^2 = a \times c$

c = third proportion

Let, $0.8 : 0.2 :: 0.2 : x$

x be the third proportion

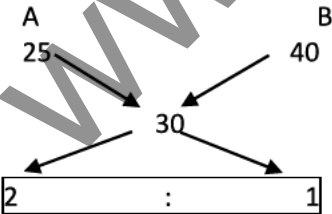
$0.2 \times 0.2 = x \times 0.8$

$\frac{2}{10} \times \frac{2}{10} = x \times \frac{8}{10}$

$\rightarrow \frac{4}{8 \times 10} = x \rightarrow \frac{1}{20} = x$

$\rightarrow 0.05 = x$

188. (a) By alligation



Let, no. of students in class A be x

no. of student in B be y

\rightarrow Total marks of class A

Total marks of class B = 40y

Total marks of A + B

$= (25x + 40y)$

\rightarrow Now on mixing the two class no.

of students becomes (x + y) and

average

Total marks = $30(x + y)$

$\rightarrow 25x + 40y = 30(x + y)$

$25x + 40y = 30x + 30y$

$x = 2y$

$x : y = 2 : 1$

189. (c) Big : Medium : Smaller

Rates(Rs.) 15 : 10 : 5

Quantity (kg.) 3 : 2 : 5

Total cost (Rs.) 45 + 20 : 25

Total cost = $45 + 20 + 25 = \text{Rs. } 90$

Total quantity = $3 + 2 + 5 = 10$

Average cost = $\frac{90}{10} = \text{Rs. } 9$

190. (a) Boys : Girls

Girls : Teacher

B : G

G : T

4 : 3

8 : 1

B : G : T

4 : 3 : 1

8 : 1

32 : 24 : 3

Total students = B + G

$= 32 + 24 = 56$

Student : Teachers

56 : 3

191. (b) $\frac{3x+5}{5x-2} = \frac{2}{3}$

\rightarrow Cross multiply the equation

$9x + 15 = 10x - 4$

$x = 19$

192. (d) A : B : C

5 : 3

↙ ↘

4 : 5

20 : 12 : 15

Let, $20x : 12x : 15x$

$20x + 12x + 15x = 47x$

$47x = 564$

$x = \frac{564}{47} \rightarrow 12$

number scored by B

$= 12x = 12 \times 12 = 144$

193. (a) Profit = 20% = $\frac{20}{100}$

→ CP = 100

P = 20

SP = 120

(By selling at Rs. 9 are earns 20%

Profit so, SP = 9Rs.

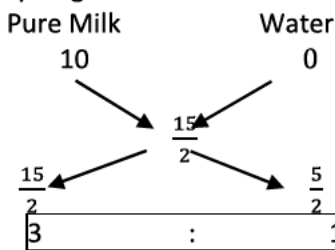
120 → = Rs. 9

1 → $\frac{9}{120}$

100 → $\frac{9}{120} \times 100$

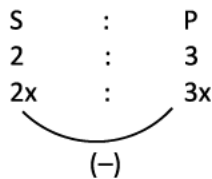
CP → $\frac{45}{6} \rightarrow \frac{15}{2}$

By alligation



NOTE : Water is added so, price of Water is taken zero.

194. (d) Sumit's age : Prakash's age



$3x - 2x = x$

given $x = 6$

→ Present age of sumit

$= 6 \times 2 = 12$

Present age of Prakash

$= 3 \times 6 = 18$

Age of Sumit after 6 years

$= 12 + 6 = 18$ years

Age of Prakash after 6 years

$= 18 + 6 = 24$ years

Sumit : Prakash

18 : 24

3 : 4

195. (c) 7, 16, 43, 79

if a, b, c, d are in proportion

→ a : b : c : d

the $ad = bc$

Let k is added to make if a proportion

→ $(7+x) : (16+x) : (43+x) : (79+x)$

→ $(7+x)(79+x) = (16+x)(43+x)$

$x^2 + 86x + 553 = x^2 + 59x + 688$

$27x = 135$

$x = 5$

Hence, if 5 is added to make it a proportion

196. (c) A : B

4x : 7x

Now 4 is added to each number

$\frac{4x+4}{7x+4} \rightarrow \frac{3}{5}$

→ $20x+20 \rightarrow 21x+12$

$x \rightarrow 8$

smaller number is

$4 \times 8 = 32$

larger number is

$7 \times 8 = 56$

197. (b) A : B : C

No. of students initially $4x : 6x : 9x \rightarrow 19x$

After admitting 12 students more in each class $7x : 9x : 12x \rightarrow 28x$

students more in each class $3x : 3x : 3x$

$3x = 12$

$x = 4$

Initially the no. of student

$= 19 \times 4 = 76$

198. (a) Old : New

No. of workers 15 : 11

Wages $\frac{22}{66} : \frac{25}{55}$

Total wages $\frac{330}{66} : \frac{275}{55}$

66 : 55

6 : 5

199. (c) A : B

3x : 5x

If 9 is subtracted from each number

$\frac{3x-9}{5x-9} \rightarrow \frac{12}{23}$

$69x - 207 \rightarrow 60x - 108$

$9x \rightarrow 99$

$x \rightarrow 11$

Numbers are = $3 \times 11 = 33$

$= 5 \times 11 = 55$

200. (a) Gold : Copper

$A(7:2)_{x2} = 9_{x2} \rightarrow 14 : 4$

$B 7 : 11 = 18 \rightarrow 7 : 11$

→ equal quantities of A & B are mixed so, make quantity equal

Gold : Copper

A 14 : 4

B $\frac{7}{21} : \frac{11}{15}$

C $\frac{21}{21} : \frac{15}{15}$

$$\boxed{7} : \boxed{5}$$

201. (c) The proportion taken out

$$\rightarrow \frac{6}{60} = \frac{1}{10}$$

originally milk : After taken out

(1) Time	10	:	9
(2) Time	10	:	9
(3) Time	<u>10</u>	:	<u>9</u>
	<u>1000 units</u>	:	<u>729 units</u>

1000 units → 60 liters given

$$1 \text{ unit} \rightarrow \frac{60}{1000} \text{ liters}$$

$$729 \text{ units} \rightarrow \frac{60}{1000} \times 729$$

$$\rightarrow \frac{4374}{100} \rightarrow 43.74 \text{ liters}$$

ALTERNATE :

$$\text{Final quantity} = 60 \left(1 - \frac{6}{60}\right)^3$$

$$= 60 \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10}$$

$$= 43.74 \text{ liters}$$

202. (d) $69\frac{3}{13}\%$ = $\frac{900}{1300}$

$$= \frac{9 \leftarrow \text{Milk}}{13 \leftarrow \text{mixture}}$$

Milk : Water

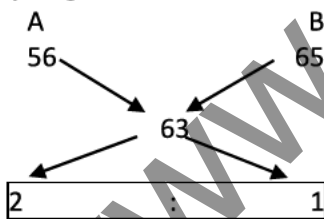
A	8	:	5	= 13 _{x7}
B	5	:	2	= 7 _{x13}
C	9	:	4	= 13 _{x7}

→ make quantities equal

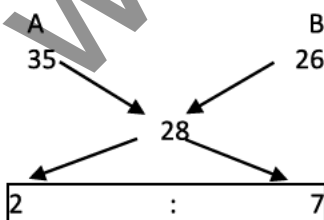
→ Milk : Water

A	56	:	35
B	65	:	26
C	63	:	28

By alligation method

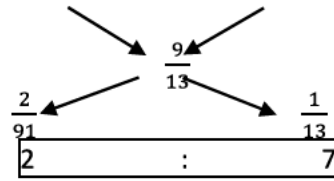


OR



→ or we can directly do it →

A	B
$\frac{8}{13}$	$\frac{5}{7}$

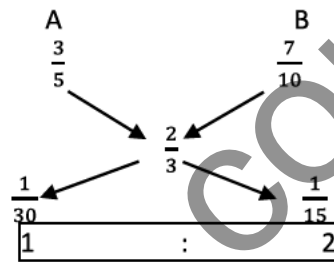


203. (b) Milk : Water

$$A \quad 3 \quad : \quad 2 \quad = 5$$

$$B \quad 7 \quad : \quad 3 \quad = 10$$

$$\text{New mixture} \quad 2 \quad : \quad 1 = 3$$



204. (c) Chromium : Steel

$$A \quad 2 \quad : \quad 11 = 13_{x(2 \times 3)}$$

$$B \quad 5 \quad : \quad 21 = 26_{x3}$$

$$\text{New mixture} \quad 7 \quad : \quad 32 = 39_{x2}$$

Make amount equal by taking

LCM

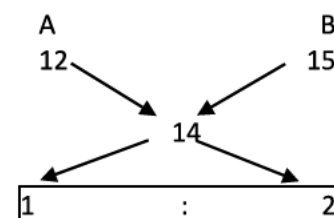
$$= 13, 26, 39 = 13 \times 2 \times 3$$

Chromium : Steel

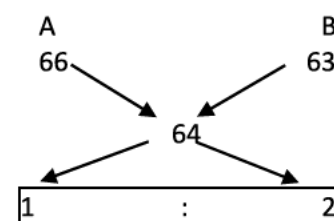
$$A \quad 12 \quad : \quad 66$$

$$B \quad 15 \quad : \quad 63$$

$$\text{New mixture} \quad 14 \quad : \quad 64$$



OR



205. (C) A : B

$$\text{Initial} \quad 7 \quad : \quad 5 \quad \left. \vphantom{\begin{matrix} 7 \\ 5 \end{matrix}} \right\} 4 \text{ units}$$

$$\text{Final} \quad 7 \quad : \quad 9 \quad \left. \vphantom{\begin{matrix} 7 \\ 9 \end{matrix}} \right\} 4 \text{ units}$$

$$4 \text{ units} = 9 \text{ ltr.}$$

$$1 \text{ unit} = \frac{9}{4} \text{ ltr.}$$

B is added so, A part remains

same and quantity of mixture
remains same

Amount of mixture

$$\rightarrow 7+16 = 16 \text{ units}$$

$$16 \times \frac{9}{4} = 36 \text{ liters}$$

Initial ratio

$$\rightarrow A : B$$

$$7x : 5x$$

$$12x = 36 \text{ liters}$$

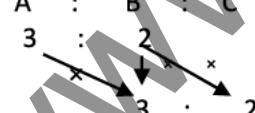
$$x = \frac{36}{12} = 3 \text{ liters}$$

$$A = 7 \times 3 = 21 \text{ liters}$$

$$B = 5 \times 3 = 15 \text{ liters}$$

206. (b) A : B : C
Annual Income 1 : 3 : 7
Let x : 3x : 7x
given A + c \rightarrow x + 7x = 8x
8x = 8,00,000
x = 1,00,000
= 300000
Monthly salary
 $\frac{300000}{12} = \text{Rs. } 25000$

207. (d) Amit : Veer
Income 3 : 2
Expenses 5 : 3
Saving 1000 : 1000
Income \rightarrow expenses + savings
 $\frac{3x-1000}{2x-1000} = \frac{5}{3}$
 $9x - 3000 = 10x - 5000$
x = 2000
Annual income of Amit is
= 3x = 3 \times 2000
= Rs. 6000

208. (a) A : B : C
3 : 2 : x

Annual 9 : 6 : 4
Income 9x : 6x : 4x
Given, $\frac{4}{3} - 1000 = \frac{c}{4}$
 $\rightarrow \frac{9x}{3} - 1000 = \frac{4x}{4}$
3x - 1000 = x
2x = 1000
x = 500
Income of B is
6x = 6 \times 500 = Rs. 3000

209. (c) Refrigerator : Television

Price 5 : 3
Let 5x : 3x

$$\text{Given } 5x - 3x = 2x$$

$$2x = 5500$$

$$x = 2750$$

Price of refrigerator

$$\rightarrow 5 \times 2750 = \text{Rs. } 13750$$

210. (a) Passed : Failed = Total
6 : 1 = 7

$$\text{Let } 6x : x = 7x$$

Now is passed student exceeds
by 6 the ratio becomes :

$$\text{Passed : Failed } \rightarrow \text{Total}$$

$$9 : 1 \rightarrow 10$$

$$\frac{\text{Passed students}}{\text{Total Students}} \rightarrow \frac{6x}{7x}$$

(Initially)

$$= \text{if } \frac{6x+6}{7x}$$

$$\rightarrow \frac{9}{10}$$

$$= 60x + 60 = 63x$$

$$3x = 60$$

$$x = 20$$

Total no. of examinees are

$$= 7 \times 20 = 140$$

211. (d) box : paper bundle
weight 3 : 22
let 3x : 22x
Total weight = 3x + 22x
= 25x = 36 kg.
 $x = \frac{36}{25} \times 1000 = 1440 \text{ grams}$
(1 kg = 1000 grams)
Weight of paper bundles
 $\rightarrow 22x$
= 22 \times 1440 grams = 31680 grams

212. (b) Let number be x & y

$$\text{Given } x : y$$

$$3 : 4$$

$$\rightarrow 3a : 4a$$

Now, given that

$$\rightarrow 8(3a)^2 \rightarrow (4a)^2 + 224$$

$$72a^2 = 16a^2 + 224$$

$$56a^2 = 224$$

$$a^2 = 4$$

$$a = 2$$

numbers are

$$x = 3 \times 2 = 6$$

$$y = 4 \times 2 = 8$$

213. (c) $A : B : C$

$$\begin{array}{ccc} 2 & : & 3 \\ \hline & 6 & : & 11 \\ \hline 12 & : & 18 & : & 33 \\ \hline 4 & : & 6 & : & 11 \end{array}$$

214. (b) $\frac{2}{3}A = \frac{4}{5}B$

$$\rightarrow 10A = 12B$$

$$= A : B$$

$$12 : 10$$

$$6 : 5$$

215. (a) $(a+b) : (b+c) : (c+a)$

Let $6 : 7 : 8$

$$a+b+b+c+c+a \rightarrow 6x+7x+8x$$

$$2a+2b+2c \rightarrow 21x$$

$$2(a+b+c) = 21x$$

$$\rightarrow a+b+c = \frac{21}{2}x$$

$$\rightarrow a+b+c = 14 \text{ given}$$

$$\rightarrow \frac{21x}{2} = 14$$

$$x = \frac{28}{21} = \frac{4}{3}$$

$$a+b = 6 \times \frac{4}{3} = 8$$

$$a+b+c = 14$$

$$c = 14 - 8 = 6$$

216. (c) $5.5a = 0.65b$

$$\frac{55}{10}a = \frac{65}{100}b$$

$$55a = \frac{65}{10}b$$

$$a : b = 65 : 550 = 13 : 110$$

217. (c) Boys : Girls

$$5 : 3$$

Let $5x : 3x$

$$\rightarrow \text{Now 50 boys leave the college}$$

$$\text{and 50 girls joins the college}$$

$$\frac{5x-50}{3x+50} = \frac{9}{7}$$

$$\rightarrow 35x - 350 = 27x + 450$$

$$8x = 800$$

$$x = 100$$

no. of boys = $5x$

$$= 5 \times 100 = 500$$

218. (a) $A : B : C : D$

$$\frac{1}{3} : \frac{1}{4} : \frac{1}{5} : \frac{1}{6}$$

Take L.C.M of 3, 4, 5, 6

$$= 3 \times 2 \times 2 \times 5 = 60$$

$$A : B : C : D$$

$$\frac{1}{3} \times 60 : \frac{1}{4} \times 60 : \frac{1}{5} \times 60 : \frac{1}{6} \times 60$$

Total pens

$$20+15+12+10 = 57$$

219. $A = \frac{2}{3}B$

and $B = \frac{4}{5}C$

$$3A = 2B \quad 5B = 4C$$

$$A : B \quad B : C$$

$$2 : 3 \quad 4 : 5$$

$$A : B : C$$

$$2 : 3$$

$$\frac{4}{3} : \frac{5}{3}$$

$$8 : 12 : 15$$

220. (d) $(25)^{2.5} : 5^3$

$$(5)^{25.5 \times 2} : 5^3$$

$$5^3 : 5^3$$

$$5^3 : 5^3$$

$$5^2 : 1$$

$$25 : 1$$

221. (c) Three numbers are

$$a : b : c$$

$$\text{then } b^2 = ac$$

third proportional

$$c = \frac{b^2}{a}$$

Let third proportion of 12, 18 is x

$$12 : 18 :: 18 : x$$

$$= 18 \times 18 = 12 \times x$$

$$x = \frac{18 \times 18}{12} = 3 \times 9 = 27$$

222. (b) $x : y : z$

$$3 : 2$$

$$\frac{3}{2} : \frac{2}{2}$$

$$9 : 6 : 4$$

runs scored by $A + B + C = x + y + z$

$$= 9x + 6x + 4x = 19x$$

$$\rightarrow A + B + C = 342 \text{ (given)}$$

$$x = \frac{342}{19} = 18$$

runs scored by A
= $9x = 9 \times 18 = 162$

runs scored by B
= $6x = 6 \times 18 = 108$

runs scored by C
= $4x = 4 \times 18 = 72$

(162, 108, 72)

223. (b) A : B : C

$$3 : 4$$

$$\frac{6 : 5}{18 : 24 : 24}$$

$$\frac{9 : 12 : 10}{C : A}$$

$$10 : 9$$

224. (a) If there are four numbers

a, b, c, d

then

$$a : b :: c : d$$

two mean proportions are, b and c

$$a \times d = b \times c$$

Now let mean proportion of

2 & 54 are x, y

$$= 2 : x : y : 54$$

$$xy = 54 \times 2 = 108$$

go through options

options A satisfying

(18, 6)

225. (b) Black : Brown

pairs 4 : x

price 2 : 1

$$8 : x$$

$$\text{original bill} = 8 + x$$

$$\text{Black : Brown}$$

pairs x : 4

price 2 : 1

$$2x : 4$$

$$\text{new bill} = 2x + 4$$

According to the question

$$3(8+x) = 2(2x+4)$$

$$\rightarrow 24 + 3x = 4x + 8$$

$$x = 16$$

Brown pairs = 16

black pairs = 4

ratio = 1 : 4

226. (c) ratio of ages of Boys A & b

$$A : B$$

Present age 5x : 6x

after two years

$$\frac{5x+2}{6x+2} = \frac{7}{8}$$

$$40x + 16 = 42x + 14$$

$$2x = 2$$

$$x = 1$$

Present age

$$A = 5 \times 1 = 5$$

$$B = 6 + 12 = 18$$

$$\frac{A}{B} = \frac{17}{18}$$

227. (C) Present ages of A & B are 36, 50

After n years

$$\frac{A}{B} = \frac{36+n}{50+n} \rightarrow \frac{3}{4}$$

$$144 + 4n = 150 + 3n$$

$$n = 6$$

228. (a) Ist : IInd : IIIrd

$$8 : 9$$

$$\frac{3}{4}$$

$$\frac{24 : 27 : 36}{8 : 9 : 12}$$

$$8 : 9 : 12$$

$$\text{Let } 8x : 9x : 12x$$

$$\text{Ist} \times \text{IIIrd}$$

$$8x \times 12x = 2400$$

$$x^2 = \frac{2400}{96} = 25$$

$$x = 5$$

Sum of three numbers

$$\text{Ist} + \text{IInd} + 3^{\text{rd}}$$

$$8x + 9x + 12x \rightarrow$$

$$29 \times 5 = 145 \text{ Ans.}$$

229. (d) x : y

No. of balls 2 : 3

$$2x : 3x$$

\rightarrow Now 5 ball are taken out of

bag if and put in bag x

$$\frac{2x+5}{3x-5} = \frac{1}{1}$$

$$\rightarrow 2x + 5 = 3x - 5$$

$$x = 10$$

No. of balls in each bag is

$$x \rightarrow 2 \times 10 + 5 = 25$$

$$y \rightarrow 3 \times 10 - 5 = 25$$

230. (c) Let numbers are x and y

$$(x+y)^2 = 4xy$$

$$x^2 + y^2 + 2xy = 4xy$$

$$x^2 + y^2 - 2xy = 0$$

$$x = y$$

x : y

1 : 1

231. (b) A : B : C

2 : 3 : 4

Let 2x : 3x : 4x

Sum of squares

$$A^2 + B^2 + C^2$$

$$= 4x^2 + 9x^2 + 16x^2 = 29x^2$$

$$\rightarrow 29x^2 = 1856$$

$$x^2 = 64$$

$$x = 8$$

$$A = 2 \times 8 = 16$$

$$B = 3 \times 8 = 24$$

$$C = 4 \times 8 = 32$$

232. (d) Original A : B : C
 $\frac{1}{(+) (2-1)} : \frac{2}{(+)(3-1)} : \frac{3}{(-)(4-3)}$

After adding 5 in each number $\frac{2}{1} : \frac{3}{1} : \frac{4}{1}$

1 unit = 5

$$\text{numbers are } = A = 1 \times 5 = 5$$

$$B = 2 \times 5 = 10$$

$$C = 3 \times 5 = 15$$

233. (a) Marks in English, math & science

are E, M, S respectively

given $2S = E$

$$S : E = 1 : 2$$

$$E : M = 2 : 3$$

$$S : E : M$$

$$1 : 2$$

$$\frac{2}{1} : \frac{3}{1}$$

$$1 : 2 : 3$$

Let, x : 2x : 3x

$$x + 2x + 3x = 6x = 180$$

$$x = 30$$

Marks in Science

$$= 1 \times 30 = 30$$

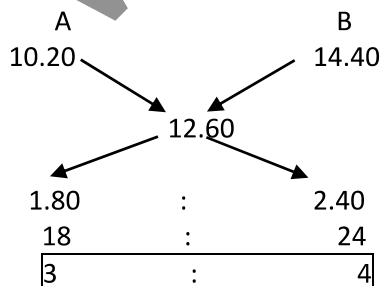
Marks in English

$$= 2 \times 30 = 60$$

Marks in Math's

$$= 3 \times 30 = 90$$

234. (d) by alligation



235. (b)

Milk : Water

$$A \quad 2 : 1 = 3 \times (8 \times 5) = 120 \rightarrow 80 : 40$$

$$B \quad 3 : 2 = 2 \times (3 \times 8) = 120 \rightarrow 72 : 48$$

$$C \quad 5 : 3 = 8 \times (5 \times 3) = 120 \rightarrow 75 : 45$$

→ Make quantity equal in all the three mixture.

So, all three are mixed

Acid : Water

$$A \quad 80 : 40$$

$$B \quad 72 : 45$$

$$C \quad \frac{75}{227} : \frac{45}{133}$$

$$\underline{\underline{227 : 133}}$$

236. (b)

Copper : Tin

$$A \quad 1 : 3 = 4 \times (11 \times 7)$$

$$B \quad 2 : 5 = 7 \times (4 \times 11)$$

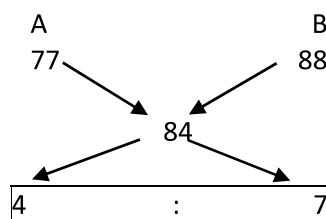
$$\text{New mixture} \quad 3 : 8 = 11 \times (7 \times 4)$$

→ Copper : Tin

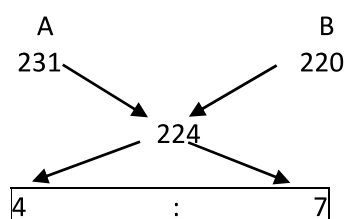
$$A \quad 77 : 231$$

$$B \quad 88 : 220$$

$$\text{New} \quad 84 : 224$$



OR



237. (d) Alcohol : Water

$$4 : 3$$

Let $4x : 3x$

5 liters of water is added to the mixture

$$\rightarrow \frac{4x}{3x+5} = \frac{4}{5}$$

$$\rightarrow 20x = 12x + 20$$

$$8x = 20$$

$$x = \frac{20}{8} = \frac{5}{2}$$

Quantity of alcohol

$$\rightarrow 4 \times \frac{5}{2} = 10 \text{ liters}$$

238. (d) Zinc : Tin

A $5x : 2x = 7x$

B $3y : 4y = 7y$

$$\rightarrow A \rightarrow 7x = 7 \text{ kg}$$

$$x = 1 \text{ kg}$$

Zinc in alloy A $\rightarrow 5 \text{ kg}$.

Tin in alloy A $\rightarrow 2 \text{ kg}$.

$$\rightarrow B \rightarrow 7y = 21 \text{ kg.}$$

$$y = 3 \text{ kg.}$$

Zinc in alloy B $\rightarrow 3 \times 3 = 9 \text{ kg}$.

Tin in alloy B $\rightarrow 3 \times 4 = 12 \text{ kg}$.

and tin in new alloy

$$\rightarrow \text{Zinc : Tin}$$

$$A \quad 5 : 2$$

$$B \quad 9 : 12$$

$$A+B \quad 14 : 14$$

$$\boxed{1 : 1}$$

239. (a) Zinc : Copper

$$5 : 3$$

Let $5x : 3x$

given, $5x+3x = 400 \text{ g}$

$$8x = 400 \text{ g}$$

$$x = 50 \text{ g}$$

Zinc : Copper

$$250 \text{ g} : 150 \text{ g}$$

Let, a gram of Copper is added

$$\rightarrow \frac{250}{150+a} = \frac{5}{4}$$

$$\rightarrow 1000 = 750 + 5a$$

$$\rightarrow 250 = 5a$$

$$a = 50 \text{ g}$$

240. (d) Wheat : Rice

Weight $4 : 3$

Rice $\frac{5}{6}$

Total price $\frac{20}{18} = 38$

$$20+18 = 38 \text{ units}$$

$$38 \text{ units} = \text{Rs. } 380$$

$$1 \text{ unit} = \text{Rs. } 10$$

Price of total rice

$$\rightarrow 18 \times 10 = \text{Rs. } 180$$

241. (c) A : B

Income $6 : 5$

Expense $\frac{4}{3} : \frac{3}{4}$

Saving $\frac{400}{400} : \frac{400}{400}$

$$\frac{6x-400}{5x-400} \times \frac{4}{3}$$

$$18x - 1200 = 20x - 1600$$

$$2x = 400$$

$$x = 200$$

Income of A

$$6 \times 200 = 1200$$

Income of B

$$5 \times 200 = 1000$$

Total sum of (A + B)

$$= 1200 + 1000 = \text{Rs. } 2200$$

242. (C) Half rupee = 50 paise

$$\text{Quarter rupee} = \frac{100}{4} = 25 \text{ paise}$$

$$50P : 25P : 10P$$

Value of coins $5x : 3x : x$

\rightarrow no. of coins

$$5x \times 2 : 3x \times 4 : x \times 10$$

$$10x : 12x : 10x$$

$$\rightarrow \text{Given, } 10x + 12x + 10x = 32x$$

$$32x = 480$$

$$x = \frac{480}{32} = 15$$

No. of coins in each case

$$\rightarrow 50P : 25P : 10P$$

$$10x : 12x : 10x$$

$$10 \times 15 : 12 \times 15 : 10 \times 15$$

$$150 : 180 : 150$$

243. (d) Rs. 1 : 50P : 20P

values $13x : 11x : 7x$

No. of coins $\frac{13x}{13x} \times 1 : \frac{11x}{11x} \times 2 : \frac{7x}{7x} \times 5$

$$\frac{13x}{13x} : \frac{22x}{11x} : \frac{35x}{7x}$$

Given, Total coins

$$= 13x + 22x + 35x = 70x$$

$$70x = 420 \rightarrow x = 6$$

No. of 50 paise coins are
 $= 22x = 22 \times 6 = 132$

244. (b) Rs. 1 : 50P : 25P
 $\frac{1}{2} : 4 : 1$

$$\frac{1}{2} : 4 : 1$$

No. of coins $\rightarrow 2x : 8x : 4x$

Values of coins $\rightarrow 2x \times 1 : 8x \times \frac{1}{2} : 4x \times \frac{1}{4}$

Total value $\rightarrow 2x + 4x : x \rightarrow 7x$

$$7x = \text{Rs. } 56 \text{ (Given)}$$

$$x = \text{Rs. } 8$$

Value of 50 paise coins are
 $= 4x = 4 \times 8 = \text{Rs. } 32$

No. of coins of 50 paise are
 $= 32 \times 2 = 64$

245. (b) A : B : C
 $2 : 3 : 4$

Let $2x : 3x : 4x$

Total $2x + 3x + 4x = 9x$

$$\rightarrow 9x = 738 \text{ Given}$$

$$x = 82$$

$$\text{Share of A} = 82 \times 2 = \text{Rs. } 164$$

$$\text{Share of B} = 82 \times 3 = \text{Rs. } 246$$

$$\text{Share of C} = 82 \times 4 = \text{Rs. } 328$$

246. (d) $\rightarrow 0.5A = 0.6B = 0.75C$

$$\rightarrow \frac{5}{10} \times A = \frac{6}{10} \times B = \frac{75}{100} C$$

$$\rightarrow \frac{1}{2} A = \frac{3}{5} B = \frac{3}{4} C$$

$$\rightarrow 10A = 12B = 15C$$

$$\rightarrow A : B : C$$

$$12 \times 15 : 10 \times 15 : 10 \times 12$$

$$\rightarrow 180 : 150 : 120$$

$$\rightarrow 6x : 5x : 4x$$

Total $6x + 5x + 4x = 15x$
 $15x = 1740$

$$\rightarrow x = \frac{1740}{15} = \text{Rs. } 116$$

Share of C is

$$4x = 4 \times 116 = \text{Rs. } 464$$

247. (b) Let C get x rupees

B get x + 8 rupees

A get x + 8 + 7 rupees

Total A + B + C

$$\rightarrow x + 15 + x + 8 + 7 = 3x + 23$$

$$\rightarrow 3x + 23 = \text{Rs. } 53 \text{ (given)}$$

$$3x = 30$$

$$x = 10$$

$$x = \text{Rs. } 10$$

Ratio of their shares

$$\begin{aligned} & A : B : C \\ & = (x+15) : (x+8) : (x) \\ & = 25 : 18 : 10 \end{aligned}$$

248. (b) A : B : C
 $2 : 3$

$$\frac{2}{8} : \frac{3}{12} : \frac{1}{15}$$

$$\rightarrow 8x + 12x + 15x = 700$$

$$\rightarrow 35x = 700$$

$$x = 20$$

$$A \rightarrow 20 \times 8 = 160$$

$$B \rightarrow 20 \times 12 = 240$$

$$C \rightarrow 20 \times 15 = 300$$

249. (b) A : B : C
 $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

(Take LCM of denominator)

$$\rightarrow \frac{1}{2} \times 12 : \frac{1}{3} \times 12 : \frac{1}{4} \times 12$$

$$6 : 4 : 3$$

$$6x : 4x : 3x$$

$$\rightarrow 13x = 2600$$

$$x = 200$$

$$A = 6 \times 200 = \text{Rs. } 1200$$

$$B = 4 \times 200 = \text{Rs. } 800$$

$$C = 3 \times 200 = \text{Rs. } 600$$

250. (b) Let P get Rs. X

Q get Rs. (x+30)

R get Rs. (x+30+60)

Total = P + Q + R

$$= x + x + 30 + x + 90$$

$$= \text{Rs. } (3x + 120)$$

$$\rightarrow 3x + 120 = 300$$

$$3x = 180$$

$$x = \text{Rs. } 60$$

$$P : Q : R$$

$$60 : 90 : 150$$

$$2 : 3 : 5$$

251. (c) $\frac{1}{2} A = \frac{1}{3} B = \frac{1}{4} C$

$$\rightarrow A : B : C$$

$$2 : 3 : 4$$

$$2x : 3x : 4x = 900$$

$$9x = 900$$

$$x = 100$$

$$A = 200$$

$$B = 300$$

$$C = 400$$

252. (C) $A : B : C$
 $2 : 5 : 4$

$$2x + 5x + 4x = 11x$$

$$11x = \text{Rs. } 126.50$$

$$x = \text{Rs. } 11.50$$

$$\rightarrow \text{Share of B} = 5x$$

$$\text{Share of A} = 2x$$

$$\text{Share of (B - A)} = 3x$$

$$\rightarrow 3 \times 11.50 = \text{Rs. } 34.50$$

253. (b) Let C get x rupees
 B get $x + 6$ rupees
 A get $x + 6 + 7$ rupees
 $= A + B + C \rightarrow (3x + 19)$
 $3x + 19 = 76$
 $3x = 76 - 19 \rightarrow 57$
 $x = 19$

$$A \text{ get} = 19 + 13 = \text{Rs. } 32$$

$$B \text{ get} = 19 + 6 = \text{Rs. } 25$$

$$C \text{ get} = \text{Rs. } 19$$

$$A : B : C$$

$$32 : 25 : 19$$

254. (d) $A + B + C = \text{Rs. } 3000$ (given)

$$\rightarrow \frac{1}{3}(B + C)A \quad (\text{Given})$$

$$\rightarrow B + C = 3A$$

$$A + 3A = 3000$$

$$A = \frac{3000}{4} = \text{Rs. } 750$$

$$\text{Again, } \frac{2}{3}(A + C) = B \text{ Given}$$

$$\rightarrow 2(A + C) = 3B$$

$$\rightarrow 2(A + B + C) = 2 \times 3000$$

$$2(A + C) + 2B = \text{Rs. } 6000$$

$$3B + 2B = 6000$$

$$B = \frac{6000}{5} = 1200$$

$$A + B + C = 3000$$

$$= 750 + 1200 + C = 3000$$

$$C = 3000 - 1950 = \text{Rs. } 1050$$

255. (a) $a : b :: c : d$
 $a \times d = b \times c$

So, go through options

(a) $9 \times 16 = 12 \times 12$ (✓)

(b) $13 \times 4 = 11 \times 5$ (✗)

(c) $30 \times 24 = 45 \times 13$ (✗)

(d) $3 \times 5 = 5 \times 2$ (✗)

So, answer is $12 : 9 :: 16 : 12$

256. (b) $8 : x : 50$
 $x^2 = 50 \times 8$
 $x^2 = 400$
 $x = 20$

257. (c) $A : B : C$
 $7 : 9$
 $\swarrow \quad \searrow$
 $3 \quad 5$
 \hline
 $21 : 27 : 45$
 \hline
 $7 : 9 : 15$

258. (b) Length : Width
 $5x : 2x$
 Width $\rightarrow 2x \rightarrow 40 \text{ m}$
 $x \rightarrow 20 \text{ m}$
 length $\rightarrow 5 \times 20 = 100 \text{ m}$

259. (a) $A : B$
 age $4 : 7$
 $4x : 7x$
 $7x - 4x = 3x$

$$\rightarrow 3x = 30 \text{ years (Given)}$$

$$x = 10 \text{ years}$$

$$\text{Age of A} = 4 \times 10 = 40 \text{ years}$$

$$\text{age of B} = 7 \times 10 = 70 \text{ years}$$

$$\text{sum of age of A + B}$$

$$= 40 + 70 = 110 \text{ years}$$

260. (a) $A + B = 20$
 $A - B = 25$
 $2A = 45$

$$A = \frac{45}{2}$$

$$B = 20 - \frac{45}{2} = \frac{5}{2}$$

$$A : B$$

$$\frac{45}{2} : \frac{5}{2}$$

$$= -9$$

261. (b) $A : B$
 $11 : 15$

\rightarrow Let x be subtracting from both numbers

$$\rightarrow \frac{11-x}{15-x} \rightarrow \frac{2}{3}$$

$$= 33 - 3x = 30 - 2x$$

$$x = 3$$

262. (d) Milk : Water

$$\begin{array}{l} A \quad 3 \quad : \quad 1 = 4 \times 7 \\ B \quad 5 \quad : \quad 2 = 7 \times 4 \\ \rightarrow \quad \text{Milk} \quad : \quad \text{Water} \\ A \quad 21 \quad : \quad 7 \\ B \quad \underline{20} \quad : \quad \underline{8} \\ \text{New mixture} \quad \underline{41} \quad : \quad \underline{15} \end{array}$$

263. (d) Alcohol : Water

$$\begin{array}{l} A \quad 2 \quad : \quad 1 = 3 \times 5 \\ B \quad 3 \quad : \quad 2 = 5 \times 3 \end{array}$$

$$\begin{array}{l} \rightarrow \quad \text{Alcohol} \quad : \quad \text{Water} \\ A \quad 10 \quad : \quad 5 \\ B \quad \underline{9} \quad : \quad \underline{6} \\ \text{New mixture} \quad \underline{19} \quad : \quad \underline{11} \end{array}$$

264. (c) Rs. 1 : 50P : 25P

$$\begin{array}{l} \text{Value of coins} \quad 8x \quad : \quad 4x \quad : \quad 3x \\ \text{No. of coins} \quad 8x \times 1 \quad : \quad 4x \times 2 \quad : \quad 3x \times 4 \\ \quad \quad \quad \quad 8x \quad : \quad 8x \quad : \quad 12x \end{array}$$

Total coins

$$\rightarrow 8x + 8x + 12x = 28x$$

$$28x = 280 \text{ (Given)}$$

$$x = \frac{280}{28} = 10$$

No. of 50P coins are

$$= 8x = 8 \times 10 = 80$$

265. (a) A + B + C = 555

$$A : B : C$$

Original ratio

$$= \frac{1}{4} : \frac{1}{5} : \frac{1}{6} \quad (\text{LCM} = 60)$$

$$= \frac{1}{4} \times 60 : \frac{1}{5} \times 60 : \frac{1}{6} \times 60$$

$$= 15 : 12 : 10$$

$$15x + 12x + 10x = 37x$$

$$x = \frac{555}{37} = 15$$

$$\text{C get} \rightarrow 10 \times 15 = \text{Rs. } 150$$

\rightarrow By mistake the ratio of

$$A : B : C \quad (\text{Taken})$$

$$4 : 5 : 6$$

$$4x + 5x + 6x = 15x$$

$$15x = 555$$

$$x = \frac{555}{15} = 37$$

$$\text{C get} \rightarrow 6x = 37 \times 6 = \text{Rs. } 222$$

Amount of C exceeds

$$= 222 - 150$$

$$= \text{Rs. } 72$$

266. (a) Share of son : Wife : Daughter are

$$S \quad : \quad W \quad : \quad D$$

$$3 \quad : \quad 1$$

$$\underline{\quad \quad \quad 3 \quad : \quad 1}$$

$$\underline{\quad \quad \quad 9 \quad : \quad 3 \quad : \quad 1}$$

$$\text{Total} \rightarrow 9x + 3x + x = 13x$$

$$= \text{Share of son} = 9x$$

Share of daughter = x

= Difference between share of son and share of daughter

$$9x - x = 8x = 10000$$

$$x = \text{Rs. } 1250$$

$$\text{Total property} = 13x = 13 \times 1250 = \text{Rs. } 16250$$

267. (c) The distance covered by policeman in 5 steps is equal to that of thief in 7 steps

$$\rightarrow 5P = 7T$$

$$P : T$$

7 : 8 (distance covered in each step)

\rightarrow and policeman goes 8 steps while thief moves 10 steps

	Policeman	Thief
Steps	8	10
Distance in each steps	$\frac{7}{56}$	$\frac{5}{50}$
Speed =	$\frac{28}{56}$	$\frac{25}{50}$

268. (d) Tom : Jerry

Jumps	8	6
Distance each jump	$\frac{5}{40}$	$\frac{7}{42}$
Speed =	$\frac{20}{40}$	$\frac{21}{42}$

269. (d) Let number be 4x and 5x

According to question

$$(5x)^2 - (4x)^2 = 81$$

$$9x^2 = 81$$

$$x^2 = 9$$

$$x = 3$$

$$\text{value of } A = 4 \times 3 = 12$$

270. (b) Let x is added

$$\rightarrow \frac{2+x}{5+x} = \frac{5}{6}$$

$$\rightarrow 12+6x = 25+5x$$

$$\rightarrow x = 13$$

So, x = 13 will be added

271. (d) According to the question

	Sn	Fe	
A \rightarrow	1	2	= 3) $\times 5$
B \rightarrow	2	3	= 5) $\times 3$

Making quantity equal

	Sn	Fe	
A \rightarrow	5	10	= 15) $\times 3$
B \rightarrow	6	9	= 15) $\times 4$

$$\begin{array}{l} \text{Sn} \quad \text{Fe} \\ \text{A} \rightarrow 15 : 30 \\ \text{B} \rightarrow \underline{24} : \underline{36} \\ \quad \quad 39 : 66 \end{array}$$

In final mixture

$$\begin{aligned} \text{sn} : \text{Fe} &= 39 : 66 \\ &= 13 : 22 \end{aligned}$$

272. (d) According to the question,

$$\begin{aligned} \rightarrow \frac{2x+8}{3x+8} &= \frac{3}{4} \\ \rightarrow 8x+32 &= 9x+24 \\ \rightarrow 8 &= x \end{aligned}$$

Let the 2 numbers (2x, 3x),
Therefore, the sum of the two numbers is

$$\begin{aligned} &= 2x + 3x \\ &= 5x \\ &= 5 \times 8 = 40 \end{aligned}$$

273. (c) Given :

$$\begin{aligned} \frac{x}{y} &= \frac{3}{4} \\ \rightarrow \frac{2x+3y}{3y-2x} &= \frac{2 \times 3 + 3 \times 4}{3 \times 4 - 2 \times 3} \\ &= \frac{6+12}{12-6} = \frac{18}{6} = 3 : 1 \end{aligned}$$

This is required ratio 3 : 1

274. (b) Let their income 4x and 3x

Their saving = Rs.3200 each

According to the questions,

$$\begin{aligned} \rightarrow \frac{4x-3200}{3x-3200} &= \frac{12}{7} \\ \rightarrow \frac{x-800}{3x-3200} &= \frac{3}{7} \\ \rightarrow 7x-5600 &= 9x-9600 \\ \rightarrow 2x &= 9600-5600 \\ \rightarrow 2x &= 4000 \\ \text{A} &= 2000 \end{aligned}$$

$$\begin{aligned} \rightarrow \text{Income of A} &= 4x \\ &= 4 \times 2000 = \text{Rs. } 8000 \end{aligned}$$

275. (a) Let their monthly income 8x and 5x

According to the question

$$\frac{8x-12000}{5x-10000} = \frac{5}{3}$$

[Income - Saving = Expenditure]

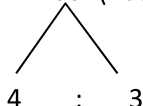
$$\begin{aligned} \rightarrow 24x - 36000 \\ &= 25x - 50000 \\ x &= 14000 \end{aligned}$$

Diff. in monthly income

$$\begin{aligned} &= 8x - 5x = 3x \\ x &= 14000 \end{aligned}$$

$$3x = 14000 \times 3 = \text{Rs. } 42000$$

276. (a) 1554 (Total student)



$$\begin{array}{l} \downarrow \times 222 \quad \downarrow \times 222 \\ 888 \quad 666 \\ \text{(Boys)} \quad \text{(Girls)} \\ 7 \text{ units} = 888 + 666 = 1554 \\ 1 \text{ unit} = 222 \end{array}$$

ATQ

$$\frac{888-x}{666+30} = \frac{7}{6} \quad [x \text{ number of boys left}]$$

$$6 \times 888 - 6x = 7 \times 696$$

$$5328 - 6x = 4872$$

$$6x = 456 \rightarrow x = 76$$

277. (d) According to the question,

$$\begin{aligned} \frac{x^3-y^3}{x^2+xy+y^2} &= \frac{5}{1} \\ \frac{(x-y)(x^2+xy+y^2)}{x^2+xy+y^2} &= \frac{5}{1} \end{aligned}$$

$$x - y = 5 \quad \dots\dots (i)$$

$$\frac{x^2-y^2}{x-y} = \frac{7}{1}$$

$$\frac{(x+y)(x-y)}{x-y} = \frac{7}{1}$$

$$x + y = 7 \quad \dots\dots (ii)$$

Solve equation (i) and (ii)

$$x = 6$$

$$y = 1$$

$$\frac{2x}{3y} = \frac{2 \times 6}{3 \times 1} = \frac{4}{1}$$

278. (b) A : B = $\frac{1}{2} : \frac{1}{3} = (3 : 2)_{\times 3}$

$$B : C = \frac{1}{5} : \frac{1}{3} = (3 : 5)_{\times 2}$$

$$A : B : C = 9 : 6 : 10$$

$$(A + B) : (B + C) = (9+6) : (6+10) = 15 : 16$$

279. (a) According to the question,

$$\frac{\text{Story books}}{\text{other books}} = \frac{7}{2}$$

$$\text{Story books} = 1512$$

$$7 \text{ units} \rightarrow 1512$$

$$1 \text{ unit} \rightarrow \frac{1512}{7} = 216$$

$$2 \text{ units} \rightarrow 216 \times 2 = 432$$

$$\text{other books} = 432$$

$$\text{New ratio of } \frac{\text{story books}}{\text{other books}} = \frac{15}{4}$$

As we know that only story books are added

$$4 \text{ units} \rightarrow 432$$

$$1 \text{ units} \rightarrow \frac{432}{4} = 108$$

$$15 \text{ units} \rightarrow 108 \times 15 = 1620$$

$$\text{New collection of story books} = 1620$$

$$\text{Number of story books are added}$$

$$= 1620 - 1512 = 108$$

280. (c) According to the question,

Mixture of copper and aluminum

= 2000 gm
 30% is copper means = $\frac{30}{100} \times 2000$
 = 600 gm copper

Copper 600 gm
 aluminum 1400 gm + x

20% = 600
 1 unit = 30
 $\frac{30}{20\%}$

1400 + x = 2400 gms
 x = 1000 gms

281. (a) According to the question,

	Rs 1	50 paise	25 paise
Ratio of quantity	2	3	5
value in Rupees	$\frac{2}{2}$	$\frac{1.5}{1.5}$	$\frac{1.25}{1.25}$

Total value in rupees = Rs. 4.75
 4.75 unit _____ 288
 1 unit _____ $\frac{288}{4.75} = 48$
 3 unit _____ $48 \times 3 = 144$

50 paise coins = 144 coins

282. Let the first part is = x
 second part is = y

According to the question,
 $5x + 11y = 195$ (i)
 $x + y = 27$ (ii)
 Solve equation (i) and (ii)

$x = 7$
 $y = 10$
 $\frac{x}{y} = \frac{17}{10}$

283. (b)

Milk : water
 5 : 1
 1 unit increase = 5 liters

$\frac{5}{5} : \frac{1}{2}$
 $\downarrow \times 5$
 25 liter
 1 unit \rightarrow 5 ltr
 5 unit \rightarrow 25 ltr

The quantity of milk in mixture = 25 ltr

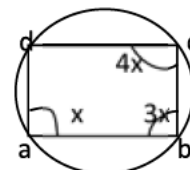
284. (a) Ratio of sides

7 : 9 : 12 \rightarrow 36 cm

diff = 5 unit $\xrightarrow{\times 3}$ 15 cm
 1 unit = 3cm
 12 units = $12 \times 3 = 36$ cm

thus, largest sides = 36 cm

285. (a)



(sum of opposite angles in cyclic quadrilateral are 180°)

$\rightarrow x + 4x = 180^\circ$
 $\rightarrow 5x = 180^\circ$
 $\rightarrow x = 36^\circ$
 $\angle b = 3x \rightarrow 3 \times 36 \rightarrow 108^\circ$
 $\angle b = 180^\circ - 108^\circ \rightarrow 72^\circ$
 The fourth angle = 72°

286. (c) Let,

\rightarrow Sonali's age = 5x
 \rightarrow Monali's age = 3x

According to the question,

$\rightarrow \frac{5x+5}{3x+5} = \frac{10}{7}$
 $\rightarrow \frac{x+1}{3x+5} = \frac{2}{7}$
 $\rightarrow 7x + 7 = 6x + 10$
 $\rightarrow x = 3$

\rightarrow So Monali's present age = 3 x
 = $3 \times 3 = 9$ years

287. (a) B : A : C
 1 : 2

$\frac{1}{1} : \frac{3}{2} : \frac{3}{6}$
 $\underline{\underline{1 : 2 : 6}}$

So, A : B : C
 2 : 1 : 6

288. (b) Assume no. = 5x, 8x
 According to the question,

$8x - 5x = 48$
 $3x = 48$
 $x = 16$
 Smallest no. = 5x
 = $5 \times 16 = 80$

289. (b) $\frac{a}{b} = \frac{7}{9}, \frac{b}{c} = \frac{3}{5}$

a : b = 7 : 9
 b : c = 3 : 5 = 9 : 15 [B is same]
 a : b : c = 7 : 9 : 15

290. (c) a : b = 4 : 5

b : c = 5 : 6
 c : d = 6 : 7
 a : b : c : d
 4 : 5 : 6 : 7
 a : c = 4 : 6

$$= 2 : 3$$

291. (a) $\frac{a}{b} = \frac{c}{d} = \frac{5}{1}$

$$a = c = 5$$

$$b = d = 1$$

$$\frac{3a+4c}{3b+4d} = \frac{3 \times 5 + 4 \times 5}{3 \times 1 + 4 \times 1}$$

$$= \frac{15+20}{3+4} = \frac{35}{7} = 5 \text{ s}$$

292. (a) $x : y = 3 : 5$

$$x - y = -2$$

Let number be $3A$ and $5A$

$$3A - 5A = -2$$

$$-2A = -2$$

$$A = 1$$

$$x + y = 8A$$

$$= 8 \times 1$$

$$= 8$$

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