6 RATIO AND PROPORTION

Very few questions are directly asked from this chapter. But it does not mean that chapter is of no use. The concepts of ratio and proportion find their applications in problems based on speed & distance, linear equations, partnership and many more. All the concepts and important rules related to Ratio and Proportion are discussed here. So, it is advised to go through the rules carefully.

IMPORTANT POINTS

Ratio– The comparative relation between two amounts/ quantities of same type is called ratio.

The ratio of two amounts is equal to a fraction. It shows how much less or more time an amount is in comparision to another.

Ratio always occurs between same units, as –Rupees: Rupees, kg: kg, Hour : Hour, Second : Second etc.

Let an amount be x and another is y, then, the ratio between them is x : y or x ÷ y.

In ratio 1st number i.e., 'x' is called "antecedent". and 2nd number i.e., 'y' is called "consequent".

If a:b :: c:d, then a and d are called extremes and b and c are called means.

∴ Product of extremes = Product of means.

i.e., ad = bc

Directly Proportional : If x = ky, where k is a constant, then we say that x is directly proportional to y. It is written as $x \propto y$.

Inversely Proportional : If $x = \frac{k}{y}$ where k is a constant, then we say that x is inversely proportional to y. It is written as $x \propto \frac{1}{y}$

Proportion : When two ratios are equal to each other, then they are called proportional as

a:b = c:d, then, a, b, c and d are in proportion.

or,

a:b :: c:d

E.g. 2:5 = 6 : 15, then we write 2:5 :: 6:15

RULE 1 : It does not change the ratio, when we multiply or divide antecedent and consequent of the ratio by a same non–zero number as–

e.g. $a : b = \frac{a}{b} = \frac{a \times c}{b \times c} = ac : bc = a : b$

RULE 2 : What should be added to all of a, b, c, d (numbers) so that these become proportional respectively?

Let x should be added :

Then $\frac{a+x}{b+x} :: \frac{c+x}{d+x}$

RULE 3 : Mixed ratio – Let x:y and P:Q be two ratios, then Px : Qy is called mixed ratio.

RULE 4 : Duplicate Ratio–The mixed ratio of two equal ratios is called the duplicate Ratio as

duplicate ratio of a:b is $a^2:b^2$

RULE 5 : Subduplicate Ratio–The square root of a certain ratio is called its subduplicate.

The subduplicate ratio of a:b = $\sqrt{a} : \sqrt{b}$

RULE 6 : Triplicate Ratio–The cube of a certain ratio is called triplicate ratio.

The triplicate ratio of a:b = $a^3 : b^3$

RULE 7 : Subtriplicate Ratio–The cube root of a certain ratio is called subtriplicate ratio as–

The Subtriplicate Ratio of a:b = $\sqrt[3]{a} : \sqrt[3]{b}$

RULE 8 : Inverse Ratio–The Reciprocal of quantities of ratio is called its inverse. Reciprocal or inverse ratio of a:b

$= \frac{1}{a} : \frac{1}{b}$ or $= \left(\frac{1}{a} : \frac{1}{b}\right) \times$ (L.C.M. of a and b)

RULE 9 : Invertendo–The proportion in which antecedent and consequent quantities change their places, is called invertendo, as–

Invertendo of a:b = c:d is b:a = d:c

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

RULE 10 : Alternendo–If a:b ::c:d is a proportion then its alternendo is a:c::b:d. i.e alternendo of $\frac{a}{b} = \frac{c}{d}$ is $\frac{a}{c} = \frac{b}{d}$

RULE 11 : Componendo–If a:b::c:d is a proportion, then componendo is (a + b) : b :: (c + d) : d

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

or, $\left[\frac{a}{b}+1=\frac{c}{d}+1 \Rightarrow \frac{a+b}{b}=\frac{c+d}{d}\right]$

RULE 12 : Dividendo–If a:b :: c:d is a proportion, then its dividendo is (a – b): b:: (c – d):d

It means, $\frac{a}{b} = \frac{c}{d} \Rightarrow \frac{a}{b} - 1 = \frac{c}{d} - 1$

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

RULE 13 : Componendo and dividendo–If there is a proportion a:b::c:d then its componendo and dividendo is

(a + b):(a – b)::(c + d):(c – d) or, $\frac{a+b}{a-b}=\frac{c+d}{c-d}$

To simplify the proportion any one method of componendo, dividendo, componendo and Dividendo can directly be used.

RULE 14: Mean Proportion – Let x be the mean proportion between a and b, then a:x::x:b (Real condition)

$\therefore \frac{a}{x} = \frac{x}{b} \Rightarrow x^2 = ab$

$\therefore x = \sqrt{ab}$

So, mean proportion of a and b = $\sqrt{ab}$

If x be the mean proportion between (x – a) and (x – b) then what will be the value of x ?

$x = \frac{ab}{a+b}$

RULE 15 : Third proportional–Let 'x' be the third proportional of a and b then,

a:b :: b:x (Real condition)

i.e. $\frac{a}{b} = \frac{b}{x} \Rightarrow ax = b^2$

$\therefore x = \frac{b^2}{a}$

$\therefore$ Third proportional of a and b = $\frac{b^2}{a}$

RULE 16 : Fourth Proportional– Let x be the fourth proportional of a, b and c, then a:b::c:x (Real condition)

$\Rightarrow \frac{a}{b} = \frac{c}{x} \Rightarrow ax = bc$

$\therefore x = \frac{bc}{a}$

$\therefore$ Fourth proportional of a, b and c = $\frac{bc}{a}$

RULE 17 : First Proportional–Let x be the first proportional of a,b and c, then, x:a::b:c (Real condition)

$\therefore \frac{x}{a} = \frac{b}{c} \Rightarrow cx = ab$

$\therefore x = \frac{ab}{c}$

RULE 18 : If A:B = x:y and B:C = p:q then

(i) A:C = xp : yq

(ii) A:B:C = (x:y) × p:qy =xp:yp:qy

It is done as follows:

A:B = x:y

B:C = p:q

A:B:C = xp:yp:qy

RULE 19 : If A:B = x:y, B:C = p:q and C:D = m:n then,

(i) A:D = xpm : yqn

(ii) A:B:C:D = (xp:yp:yq) × m:yqn = xpm:ypm:yqm:yqn

RULE 20 : If A:B:C:D = w:x:y:z and D:E = m:n then,

A:B:C:D:E = wm:xm:ym:zm:zn

RULE 21 : If an amount R is to be divided between A and B in the ratio m:n then

(i) Part of A = $\frac{m}{m+n}\times R$

(ii) Part of B = $\frac{n}{m+n}\times R$

(iii) Difference of part of A and B = $\frac{mn}{m+n}\times R$,

where m > n

RULE 22 : If the ratio of A and B is m:n and the difference in their share is 'R' units then,

(i) Part of A = $\frac{m}{m-n}\times R$

(ii) Part of B = $\frac{n}{m-n}\times R$

(iii) The sum of parts of A and B = $\frac{m+n}{m-n}\times R$

where m > n

RULE 23 : If the ratio of A and B is m:n and the part of A is 'R', then

(i) Share of B = $\frac{n}{m}\times R$

(ii) Total share of A and B = $\frac{m+n}{m} \times R$

(iii) Difference in share of A and B = $\frac{m-n}{m} \times R$

where m > n

RULE 24 : If the amount R is divided among A, B and C in the ratio l :m:n, then

(i) The share of A = $\frac{l}{l+m+n} \times R$

(ii) The share of B = $\frac{m}{l+m+n} \times R$

(iii) The share of C = $\frac{n}{l+m+n} \times R$

(iv) Difference in share of A and B = $\frac{l-m}{l+m+n} \times R$,

where l > m

(v) Difference in share of B and C = $\frac{l-n}{l+m+n} \times R$

where m>n

RULE 25 : If the ratio of A, B and C is l : m : n and the part of A is 'R' then,

(i) Part of B = $\frac{m}{l} \times R$

(ii) Part of C = $\frac{n}{l} \times R$

(iii) Difference in parts of B and C = $\frac{m-n}{l} \times R$,

(where m > n)

(iv) Total share of A,B and C = $\frac{(l+m+n)}{l} \times R$

RULE 26 : If an amount is to be divided among A, B and C in the ratio l : m : n and the difference between A and B is 'R', then

(i) Part of C = $\frac{n}{l-m} \times R$, where l > m

(ii) Total share of A, B and C = $\frac{l+m+n}{l-m} \times R$,

where l > m

(iii) Difference in share of B and C = $\frac{m-n}{l-m} \times R$, where

l > m and m > n

RULE 27 : If there are notes of 'x' rupees, 'y' rupees and 'z' rupees in a box in the ratio m:n:r and the total value of notes is 'R', then

(i) Number of notes of 'x' rupees = $\frac{m}{(xm+yn+zr)} \times R$

(ii) Number of notes of 'y' rupees = $\frac{n}{(xm+yn+zr)} \times R$

(iii) Number of notes of 'z' rupees = $\frac{r}{(xm+yn+zr)} \times R$

RULE 28 : If adding/subtracting a certain quantity gives new ratio, then multiplier

$= \frac{(\text{Total Quantity} \pm \text{Change in Quantity})}{\text{Sum of Ratios}}$

$\Rightarrow$ Then quantity

= Multiplier × Ratio figure of that quantity

RULE 29 : If the ratio of alligation of milk and water in a glass is m:n and in other glass alligation is p:q, then the ratio of milk and water in third glass which contains alligation of both glasses is

Ratio = $\left(\frac{m}{m+n}+\frac{p}{p+q}\right):\left(\frac{n}{m+n}+\frac{q}{p+q}\right)$

RULE 30 : If the ratio of milk and water in the alligation of A litre is p:q then water must be added in it so that ratio of milk and water would be r:s is

Required amount of water = $\frac{A(ps-qr)}{r(p+q)}$ litres

RULE 31 : The ratio of income of two persons A and B is p:q. If the ratio of their expenditures is r:s, then the monthly income of A and B, when each one of them saves 'R' rupees will be

Monthly income of A = $\frac{Rp(r-s)}{ps-rq}$

Monthly income of B = $\frac{Rp(r-s)}{ps-rq}$

RULE 32 : Let 'x' be a number which is subtracted from a, b, c and d to make them proportional, then

x = $\frac{ad-bc}{(a+d)-(b+c)}$

Let 'x' be a number which is added to a, b, c and d to make them proportional, then

$$x = \frac{bc - ad}{(a+d)-(b+c)}$$

Here, a, b, c and d should always be in ascending order.

RULE 33 : If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \ldots\ldots\ldots\ldots$, then each ratio $= \frac{a+c+e+\ldots\ldots}{b+d+f+\ldots\ldots}$

RULE 34 : Two numbers are in the ratio a:b and if each number is increased by x, the ratio becomes c:d. Then the two numbers will be $\frac{xa(c-d)}{ad-bc}$ and $\frac{xb(c-d)}{ad-bc}$

RULE 35 : Two numbers are in the ratio a:b and if x is subtracted from each number the ratio becomes c:d. The two numbers will be = $\frac{xa(d-c)}{ad-bc}$ and $\frac{xb(d-c)}{ad-bc}$

PROBLEMS BASED ON AGES

Importance : You would be knowing that such questions are asked in different competitive exams.

Scope of questions : In these questions age/ratio of ages of a person/his relatives is asked for present/future or past ages.

Way to success : Given rules and mental mapping in these questions will save your time and labour.

Rule 1.

If the ratio of present age and the ratio of age after 'n' years is given then present age factor is given by :

$$x = \frac{(\text{Difference in 2nd ratio}) \times \text{time}}{(\text{Difference in cross products of ratio})}$$

Rule 2.

If x is the present age factor, and the difference in cross product of ratio is zero then,

$$x = \frac{\text{time}}{(\text{Difference of ratio})}$$

Rule 3.

If the ratio of 'some years ago' and 'after some years' is given. And Before 't_1' years, the ratio of ages of A and B was a : b.

Present age of A = $ax + t_1$

Present age of B = $bx + t_1$

after 't_2' years, the ratio of their ages will be c : d.

$$\therefore x = \frac{(\text{Difference in 2nd ratio}) \times (t_1 + t_2)}{(\text{Difference in cross products of the ratio})}$$

When, the difference in ratios is equal, then

$$x = \frac{(t_1 + t_2)}{(\text{Difference in ratio})}$$

Rule 4.

If the product of present ages is given, then,

$$x = \sqrt{\frac{\text{Product of ages of two persons}}{\text{Product of ratio}}}$$

Rule 5.

If sum of present age and ratio of the ages is given then, present age factor,

$$x = \frac{\text{Sum of Present ages}}{\text{Sum of ratio}}$$

Rule 6.

If the ratio of ages and difference in ages is given then,

$$x = \frac{\text{difference between ages}}{\text{difference in ratio}}$$

Rule 7.

The ratio of ages of A and B was x : y 'n' years ago.

(i) If the present age ratio is a : b, then, $\frac{x+n}{y+n} = \frac{a}{b}$

(ii) If after 'm' years, the ratio of ages will be p : q then, $\frac{x+n+m}{y+n+m} = \frac{p}{q}$

Rule 8.

If 'n' years before, the ratio of ages of A, B and C was x : y : z, then the ratio of their present ages is (x + n) : (y + n) : (z + n)

Rule 9.

If after m years, the ratio of ages of A and B will be x : y, then the ratio of their present ages is (x – m) : (y – m).

MIXTURE OR ALLIGATION

Importance : Mixture is a specific type of ratio and proportion, but since 1 or 2 questions from this chapter are asked regularly in competitions hence it is comfortable and useful to study this chapter separately.

Questions are of limited nature hence marks can be ensured with very less efforts.

Scope of Questions : Questions are related to getting new mixture or alloy from mixing of two liquids/metals. In final mixture you have to find ratio of elements or to access required quantity to get a certain ratio.

Way to success : In these questions, it is very useful to know alligation method and other.

In how much ratio mixture has been made, this ratio is called the rule of mixture.

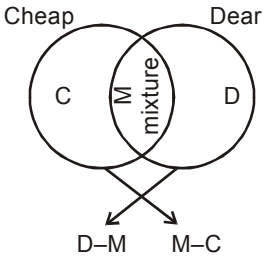
Objects < Value (Cost)
Liquidity or part.

(i) On the base of cost :

Cost of Objects < Cheap
dear/costly

RULE 1 : The cost of cheap object is Rs. C/kg and the cost of dear object is Rs. D/kg. If the mixture of both object costs Rs. M/kg. then

$$\frac{\text{Cheap object}}{\text{Dear object}} = \frac{D-M}{M-C}$$



∴ Ratio is (D – M) : (M–C)

RULE 2 : Quantity of x in mixture

$$= \frac{\text{Ratio of x} \times \text{Quantity of Mixture}}{\text{Sum of Ratios}}$$

RULE 3 : If from x litre of liquid A, p litre is withdrawn and same quantity of liquid B is added. Again from mixture q litre mixture is withdrawn and same quantity of liquid B is added. Again from mixture, r litre is withdrawn and same quantity of liquid B is added, then

In final mixture, liquid A is

$$x\left(\frac{x-p}{x}\right)\left(\frac{x-q}{x}\right)\left(\frac{x-r}{x}\right) \ldots\ldots\ldots\ldots$$

If only one process is repeated n times, then liquid A in final mixture is $= x\left(\frac{x-p}{x}\right)^n$ or $x\left(1-\frac{p}{x}\right)^n$ and liquid B in final mixture = x –(liquid A in final mixture)

RULE 4 : If x is initial amount of liquid, p is the amount which is drawn, and this process is repeated n-times such that the resultant mixture is in the ratio a : b then,

$$\frac{a}{a+b} = \left(\frac{x-p}{x}\right)^n$$

RULE 5 : There are two pots of same volume. Both the pots contains mixture of milk and water in the ratio m:n and p:q respectively. If both the mixtures are mixed together in a big pot, then what will be the final ratio of milk and water?

$$\text{Required ratio} = \left(\frac{m}{m+n}+\frac{p}{p+q}\right):\left(\frac{n}{m+n}+\frac{q}{p+q}\right)$$

RULE 6 : The ratio of milk and water in the mixture of 'x' unit liquid is a:b. If 'd' unit milk is added to it then ratio of milk and water becomes $a_1 : b_1$. Then, $d = \frac{x(a_1b-ab_1)}{(a+b)b_1}$ unit.

If 'd' unit water is added to it then,

$$d = \frac{x(ab-a_1b_1)}{(a+b)a_1} \text{ unit}$$

RULE 7 : There is x% milk in 'a' unit mixture of milk and water. The amount of milk that should be added to increase the percentage of milk from x% to y% is given by

$$\text{Required quantity of milk} = \frac{a(y-x)}{(100-y)} \text{ unit.}$$

RULE 8 : There is x% water in 'a' unit the mixture of sugar and water. The quantity of water vapourised such that decrease in the percentage of water is from x% to y% is given by

∴ Required quantity of vapourised water

$$= \frac{a(x-y)}{y} \text{ unit.}$$

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QUESTIONS ASKED IN PREVIOUS SSC EXAMS

TYPE–I

1. If a : b = 7 : 9 and b : c =15 : 7, then what is a : c?
(1) 5 : 3 (2) 3 : 5
(3) 7 : 21 (4) 7 : 15
(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

2. If $x = \frac{1}{3}y$ and $y = \frac{1}{2}z$, then x : y : z, is equal to :
(1) 3 : 2 : 1 (2) 1 : 2 : 6
(3) 1 : 3 : 6 (4) 2 : 4 : 6
(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

3. If p : q = r : s = t : u = 2 : 3, then (mp + nr + ot) : (mq + ns + ou) is equal to :
(1) 1 : 3 (2) 1 : 2
(3) 2 : 3 (4) 3 : 2
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

4. If a : b = c : d = e : f = 1 : 2, then (pa + qc + re) : (pb + qd + rf) is equal to :
(1) p : (q + r) (2) (p + q) : r
(3) 2 : 3 (4) 1 : 2
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

5. If x : y = 3 : 1, then $x^3 - y^3 : x^3 + y^3$ = ?
(1) 13 : 14 (2) 14 : 13
(3) 10 : 11 (4) 11 : 10
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

6. The fourth proportional to 0.12, 0.21, 8 is :
(1) 8.9 (2) 56
(3) 14 (4) 17
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

7. The ratio $2^{1.5} : 2^{0.5}$ is the same as :
(1) 2 : 1 (2) 3 : 1
(3) 6 : 1 (4) 3 : 2
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

8. If m : n = 3 : 2, then (4m + 5n) : (4m – 5n) is equal to :
(1) 4 : 9 (2) 9 : 4
(3) 11 : 1 (4) 9 : 1
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

9. If A : B = 3 : 4, B : C = 5 : 7 and C : D = 8 : 9 then A : D is equal to
(1) 3 : 7 (2) 7 : 3
(3) 21 : 10 (4) 10 : 21
(SSC CGL Prelim Exam. 24.02.2002 & 13.11.2005 (Middle Zone)

10. If $a : b = \frac{2}{9} : \frac{1}{3}$, $b : c = \frac{2}{7} : \frac{5}{14}$ and $d : c = \frac{7}{10} : \frac{3}{5}$ then $a : b : c : d$ is
(1) 4 : 6 : 7 : 9
(2) 16 : 24 : 30 : 35
(3) 8 : 12 : 15 : 7
(4) 30 : 35 : 24 : 16
(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

11. If b is the mean proportional of a and c, then $(a - b)^3 : (b - c)^3$ equals
(1) $a^3 : c^3$ (2) $b^2 : c^2$
(3) $a^2 : c^2$ (4) $a^3 : b^3$
(SSC CPO S.I. Exam. 05.09.2004)

12. ₹ 6200 divided into three parts proportional to $\frac{1}{2} : \frac{1}{3} : \frac{1}{5}$ are respectively
(1) ₹ 3000, ₹ 2000, ₹ 1200
(2) ₹ 3500, ₹ 1500, ₹ 1200
(3) ₹ 2500, ₹ 2000, ₹ 1700
(4) ₹ 2200, ₹ 3000, ₹ 1000
(SSC CPO S.I. Exam. 05.09.2004)

13. 94 is divided into two parts in such a way that the fifth part of the first and the eighth part of the second are in the ratio 3 : 4. The first part is :
(1) 30 (2) 36
(3) 40 (4) 28
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

14. If $a : b = 5 : 7$ and $c : d = 2a : 3b$, then $ac : bd$ is :
(1) 20 : 38 (2) 50 : 147
(3) 10 : 21 (4) 50 : 151
(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

15. If $x : y = 3 : 2$, then the ratio $2x^2 + 3y^2 : 3x^2 - 2y^2$ is equal to :
(1) 12 : 5 (2) 6 : 5
(3) 30 : 19 (4) 5 : 3
(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

16. If $a : b = b : c$, then $a^4 : b^4$ is equal to
(1) $ac : b^2$ (2) $a^2 : c^2$
(3) $c^2 : a^2$ (4) $b^2 : ac$
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

17. 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 $A : B : C : D$ is
(1) 6 : 4 : 8 : 10
(2) 6 : 8 : 9 : 10
(3) 8 : 6 : 10 : 9
(4) 4 : 6 : 8 : 10
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

18. If $A : B : C = 2 : 3 : 4$, then ratio $\frac{A}{B} : \frac{B}{C} : \frac{C}{A}$ is equal to
(1) 8 : 9 : 16 (2) 8 : 9 : 12
(3) 8 : 9 : 24 (4) 4 : 9 : 16
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

19. If $a : b = c : d = e : f = 1 : 2$, then $(3a + 5c + 7e) : (3b + 5d + 7f)$ is equal to
(1) 8 : 7 (2) 2 : 1
(3) 1 : 4 (4) 1 : 2
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

20. If $a : (b+c) = 1 : 3$ and $c : (a+b) = 5:7$, then $b : (a+c)$ is equal to
(1) 1 : 2 (2) 2 : 3
(3) 1 : 3 (4) 2 : 1
(SSC CPO S.I. Exam. 03.09.2006)

21. If $p : q : r = 1 : 2 : 4$, then $\sqrt{5p^2 + q^2 + r^2}$ is equal to
(1) 5 (2) $2q$
(3) $5p$ (4) $4r$
(SSC CPO S.I. Exam. 03.09.2006)

22. The mean proportional between $(3 + \sqrt{2})$ and $(12 - \sqrt{32})$ is
(1) $\sqrt{7}$ (2) $2\sqrt{7}$
(3) 6 (4) $\frac{15 - 3\sqrt{2}}{2}$
(SSC CPO S.I. Exam. 03.09.2006)

23. If $x : y = 2 : 3$, then the value of $\frac{3x+2y}{9x+5y}$ is equal to

(1) $\frac{11}{4}$ (2) $\frac{4}{11}$

(3) $\frac{1}{2}$ (4) $\frac{5}{14}$

(SSC CPO S.I. Exam. 03.09.2006)

24. If a, b, c are three numbers such that $a : b = 3 : 4$ and $b : c = 8 : 9$, then $a : c$ is equal to

(1) 1 : 3 (2) 2 : 3

(3) 3 : 2 (4) 1 : 2

(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (Second Sitting)

25. If $a : b : c = 2 : 3 : 4$ and $2a - 3b + 4c = 33$, then the value of c is

(1) 6 (2) 9

(3) 12 (4) $\frac{66}{7}$

(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

26. If $a : b = c : d$, then $\frac{ma+nc}{mb+nd}$ is ***not*** equal to

(1) $\frac{a}{b}$ (2) $\frac{c}{d}$

(3) $\frac{a+c}{b+d}$ (4) $\frac{c-a}{b-d}$

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

27. The ratio of A to B is 4 : 5 and that of B to C is 2 : 3. If A equals 800, C equals

(1) 1000 (2) 1200

(3) 1500 (4) 2000

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

28. If $a : b : c = 7 : 3 : 5$, then $(a + b + c) : (2a + b - c)$ is equal to

(1) 1 : 2 (2) 2 : 3

(3) 3 : 4 (4) 5 : 4

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

29. If A : B = 2 : 3 and B : C = 4 : 5, then A : B : C is

(1) 2 : 3 : 5 (2) 5 : 4 : 6

(3) 6 : 4 : 5 (4) 8 : 12 : 15

(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

30. 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

(1) 2 : 3 : 4 (2) 3 : 4 : 2

(3) 4 : 6 : 3 (4) 6 : 4 : 3

(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

31. If A : B = 2 : 3, B : C = 2 : 4 and C : D = 2 : 5, then A : D is equal to :

(1) 2 : 15 (2) 2 : 5

(3) 1 : 5 (4) 3 : 5

(SSC CPO S.I. Exam. 16.12.2007)

32. If $a : b : c = 3 : 4 : 7$, then the ratio $(a + b + c) : c$ is equal to

(1) 2 : 1 (2) 14 : 3

(3) 7 : 2 (4) 1 : 2

(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

33. 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

(1) 3 :13 (2) 9 : 13

(3) 36 :13 (4) 13 : 9

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

34. If A : B = 3 : 2 and B : C = 3 : 4 then A : C is equal to

(1) 1 : 2 (2) 2 : 1

(3) 8 : 9 (4) 9 : 8

(SSC CPO S.I. Exam. 09.11.2008)

35. If $x : y = 2 : 1$, then $(x^2 - y^2) : (x^2 + y^2)$ is

(1) 3 : 5 (2) 5 : 3

(3) 4 : 5 (4) 5 : 6

(SSC CPO S.I. Exam. 06.09.2009)

36. If ₹ 1000 is divided between A and B in the ratio 3 : 2, then A will receive

(1) ₹ 400 (2) ₹ 500

(3) ₹ 600 (4) ₹ 800

(SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

37. If $W_1 : W_2 = 2 : 3$ and $W_1 : W_3 = 1 : 2$ then $W_2 : W_3$ is

(1) 3 : 4 (2) 4 : 3

(3) 2 : 3 (4) 4 : 5

(SSC CGD Tier-I Exam. 16.05.2010 (Second Sitting)

38. If $3x = 5y = 4z$, then $x : y : z$ is equal to

(1) 9 : 12 : 16 (2) 20 : 12 : 15

(3) 15 : 10 : 9 (4) 8 : 5 : 3

(SSC SAS Exam. 26.06.2010 (Paper-1)

39. If A : B = 3 : 4 and B : C = 6 : 5, then A : (A + C) is equal to

(1) 9 : 10 (2) 10 : 9

(3) 9 : 19 (4) 19 : 9

(SSC CISF ASI Exam. 29.08.2010 (Paper-1)

40. If a and b are rational numbers and $a + b\sqrt{3} = \frac{1}{2-\sqrt{3}}$, then $a : b$ is equal to

(1) – 2 : 1 (2) 2 : 1

(3) $\sqrt{3}$: 1 (4) $-\sqrt{3}$: 1

(SSC (South Zone) Investigator Exam. 12.09.2010)

41. If A : B = 3 : 4 and B : C = 8 : 9, then A : B : C is

(1) 8 : 6 : 9 (2) 9 : 8 : 6

(3) 6 : 8 : 9 (4) 3 : 32 : 9

(SSC CPO S.I. Exam. 12.12.2010 (Paper-I)

42. If 78 is divided into three parts which are in the ratio $1 : \frac{1}{3} : \frac{1}{6}$, the middle part is

(1) $9\frac{1}{3}$ (2) 13

(3) $17\frac{1}{3}$ (4) $18\frac{1}{3}$

(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

43. If $x : y = 4 : 5$, then $(3x + y) : (5x + 3y) =$

(1) 3 : 5 (2) 5 : 3

(3) 17 : 35 (4) 35 : 17

(SSC CGL Tier-1 Exam. 19.06.2011 (Second Sitting)

44. If $x : y = 5 : 6$, then $\left(3x^2 - 2y^2\right) : \left(y^2 - x^2\right)$ is

(1) 7 : 6 (2) 11 : 3

(3) 3 : 11 (4) 6 : 7

(SSC CGL Tier-1 Exam. 26.06.2011 (Second Sitting)

45. If $x : y = 3 : 4$, then $4x + 5y : 5x - 2y =$

(1) 7 : 32 (2) 32 : 7

(3) 4 : 3 (4) 5 : 2

(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011 (Paper-I)

46. If A : B is 2 : 3, B : C is 6 : 11, then A : B : C is :

(1) 2 : 3 : 11 (2) 4 : 6 : 22

(3) 4 : 6 : 11 (4) 2 : 6 : 11

FCI Assistant Grade-III Exam. 05.02.2012 (Paper-I) East Zone (IInd Sitting)

47. If two-third of A is four-fifth of B, then A : B = ?

(1) 5 : 6 (2) 6 : 5

(3) 10 : 9 (4) 9 :10

FCI Assistant Grade-III Exam. 05.02.2012 (Paper-I) East Zone (IInd Sitting)

48. If $\frac{2}{3}$ of A = 75% of B = 0.6 of C, then A : B : C is
(1) 2 : 3 : 3 (2) 3 : 4 : 5
(3) 4 : 5 : 6 (4) 9 : 8 : 10
(SSC CGL Prelim Exam. 27.07.2008 (IInd Sitting) & SSC CISF ASI Exam. 29.08.2010)

49. ₹ 33,630 are 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
(1) ₹ 14,868 (2) ₹ 16,257
(3) ₹ 13,290 (4) ₹ 12,390
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

50. If A : B = 3 : 5 and B : C = 4 : 7, then A :B : C is
(1) 6 : 9 : 14 (2) 3 : 5 : 7
(3) 12 : 20 : 21 (4) 12 : 20 : 35
(SSC Data Entry Operator Exam. 31.08.2008)

51. If A = $\frac{4}{5}$ of B and B = $\frac{5}{2}$ of C, then the ratio of A : C is
(1) 1 : 2 (2) 2 : 1
(3) 2 : 3 (4) 1 : 3
(SSC Data Entry Operator Exam. 02.08.2009)

52. If A = $\frac{1}{4}$ B and B = $\frac{1}{2}$ C, then A : B : C is :
(1) 8 : 4 : 1 (2) 4 : 2 : 1
(3) 1 : 4 : 8 (4) 1 : 2 : 4
(SSC CHSL DEO & LDC Exam. 27.11.2010)

53. If 2A=3B = 4C, then A: B: C is :
(1) 2 : 3 : 4 (2) 4 : 3 : 2
(3) 6 : 4 : 3 (4) 3 : 4 : 6
(SSC CHSL DEO & LDC Exam. 28.11.2010 (Ist Sitting)

54. The ratio $4^{3.5} : 2^5$ is the same as
(1) 4 : 1 (2) 2 : 1
(3) 1 : 2 (4) 1 : 4
(SSC CHSL DEO & LDC Exam. 28.11.2010 (Ist Sitting)

55. If A : B = 1 : 2, B : C = 3 : 4 C : D = 6 : 9 and D : E = 12 : 16 then A : B : C : D : E is equal to
(1) 1 : 3 : 6 : 12 : 16
(2) 2 : 4 : 6 : 9 : 16
(3) 3 : 4 : 8 : 12 : 16
(4) 3 : 6 : 8 : 12 : 16
(SSC CHSL DEO & LDC Exam. 28.11.2010 (IInd Sitting)

56. If $x : y = 2 : 5$, then $(5x + 3y) : (5x - 3y)$ is equal to
(1) 5 (2) 3
(3) –3 (4) –5
(SSC CHSL DEO & LDC Exam. 28.11.2010 (IInd Sitting)

57. If $\frac{a}{b} = \frac{2}{3}$ and $\frac{b}{c} = \frac{4}{5}$, then
$(a + b) : (b + c) = ?$
(1) 3 : 4 (3) 4 : 5
(2) 5 : 9 (4) 20 : 27
(SSC Multi-Tasking (Non-Technical) Staff Exam. 27.02.2011)

58. Marks of two candidates P and Q are in the ratio of 2 : 5. If the marks of P is 120, marks of Q will be
(1) 120 (2) 240
(3) 300 (4) 360
(SSC CISF Constable (GD) Exam. 05.06.2011)

59. If A : B = 4 : 9 and A : C = 2 : 3, then (A + B) : (A + C) is
(1) 15: 13 (2) 10 : 13
(3) 13: 1 0 (4) 13: 15
(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (North Zone)

60. The third proportional to 0.8 and 0.2 is :
(1) 0.05 (2) 0.8
(3) 0.4 (4) 0.032
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

61. If $x : y = 3 : 4$, then the value of $\frac{5x - 2y}{7x + 2y} =$
(1) $\frac{7}{25}$ (2) $\frac{7}{23}$
(3) $\frac{7}{29}$ (4) $\frac{7}{17}$
(SSC Multi-Tasking (Non-Technical) Staff Exam. 22.02.2011)

62. 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
(1) 3 : 4 (2) 8 : 15
(3) 15 : 8 (4) 4 : 3
(SSC CPO S.I. Exam. 06.09.2009)

63. On mixing two classes A and B of students having average marks 25 and 40 respectively, the overall average obtained is 30. Find the ratio of the students in the class A and B.
(1) 2 : 1 (2) 5 :8
(3) 5 : 6 (4) 3 : 4
(SSC CHSL DEO & LDC Exam. 04.11.2012 (IInd Sitting)

64. A fruit seller sold big, medium and small sized apples for ₹ 15, ₹ 10 and ₹ 5 respectively. The total number of apples sold were in the ratio 3 : 2 : 5. Find the average cost of an apple.
(1) ₹ 8 (2) ₹ 10
(3) ₹ 9 (4) ₹ 7
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

65. 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 to teachers is :
(1) 56 : 3 (2) 55 : 1
(3) 49 : 3 (4) 56 : 1
(SSC CHSL DEO & LDC Exam. 04.11.2012, Ist Sitting)

66. If $\frac{3x + 5}{5x - 2} = \frac{2}{3}$, then the value of x is
(1) 11 (2) 19
(3) 23 (4) 7
(SSC CHSL DEO & LDC Exam. 04.11.2012, Ist Sitting)

67. A, B and C are batsmen. The ratio of the runs scored by them in a certain match are given below :
A : B = 5 : 3 and B : C = 4 : 5. In all they scored 564 runs. The number of runs scored by B is:
(1) 124 (2) 104
(3) 114 (4) 144
(SSC CHSL DEO & LDC Exam. 04.11.2012, Ist Sitting)

68. If $(a + b) : (b + c) : (c + a) = 6 : 7 : 8$ and $(a + b + c) = 14$, then the value of c is
(1) 6 (2) 7
(3) 8 (4) 14
(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

69. If 5.5 of a = 0.65 of b, then $a : b$ is equal to :
(1) 13 : 11 (2) 11 : 13
(3) 13 : 110 (4) 110 : 13
(SSC Multi-Tasking Staff Exam. 10.03.2013)

70. 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
(1) 300 (2) 400
(3) 500 (4) 600
(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

71. A person distributes his pens among four friends A, B, C, D in the ratio $\frac{1}{3}:\frac{1}{4}:\frac{1}{5}:\frac{1}{6}$. What is the minimum number of pens that the person should have?
(1) 57 (2) 65
(3) 75 (4) 45
(SSC Graduate Level Tier-I Exam. 21.04.2013)

72. If A = $\frac{2}{3}$ of B and B = $\frac{4}{5}$ of C, then A : B : C is.
(1) 12 : 8 : 10 (2) 15 : 10 : 8
(3) 10 : 15 : 12 (4) 8 : 12 : 15
(SSC Constable (GD) Exam. 12.05.2013)

73. The ratio of $25^{2.5} : 5^3$ is same as
(1) 5 : 3 (2) 5 : 6
(3) 1 : 25 (4) 25 : 1
(SSC Graduate Level Tier-I Exam. 19.05.2013)

74. The third proportional of 12 and 18 is
(1) 3 (2) 6
(3) 27 (4) 144
(SSC Graduate Level Tier-II Exam. 29.09.2013

75. If x runs are scored by A, y runs by B and z runs by C, then $x : y = y : z = 3 : 2$. If total number of runs scored by A, B and C is 342, the runs scored by each would be respectively
(1) 144, 96, 64 (2) 162, 108, 72
(3) 180, 120, 80 (4) 189, 126, 84
(SSC Graduate Level Tier-II Exam. 29.09.2013)

76. If A : B = 3 : 4 and B : C = 6 : 5, then C : A is
(1) 10 : 9 (2) 9 : 10
(3) 8 : 9 (4) 9 : 8
(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

77. Find two mean proportionals between 2 and 54.
(1) 6 and 18 (2) 6 and 12
(3) 12 and 18 (4) 6 and 9
(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (Ist Sitting)

78. Which of the following represents a correct proportion ?
(1) 12 : 9 = 16 : 12
(2) 13 : 11 = 5 : 4
(3) 30 : 45 = 13 : 24
(4) 3 : 5 = 2 : 5
(SSC CGL Tier-I Exam. 19.10.2014 (Ist Sitting)

79. If 18, x and 50 are in continued proportion, then the value of x is
(1) 30 (2) 3
(3) 5 (4) 32
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014

80. If A : B = 7 : 9 and B : C = 3 : 5, then A : B : C is equal to
(1) 7 : 9 : 5 (2) 21 : 35 : 45
(3) 7 : 9 : 15 (4) 7 : 3 : 15
(SSC CHSL DEO & LDC Exam. 02.11.2014 (IInd Sitting)

81. If $x : y = 5 : 2$, then
(1) 22 : 29 (2) 26 : 61
(3) 29 : 22 (4) 61 : 26
(SSC CHSL DEO & LDC Exam. 9.11.2014)

82. 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
(1) 200 m (2) 100 m
(3) 50 m (4) 80 m
(SSC CHSL DEO Exam. 02.11.2014 (Ist Sitting)

83. If $x : y : : 2 : 3$ and $2 : x : : 4 : 8$ the value of y is
(1) 6 (2) 8
(3) 4 (4) 12
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014 TF No. 999 KP0)

84. If $(a + b) : \sqrt{ab} = 4 : 1$, where $a > b > 0$, then $a : b$ is
(1) $(2 + \sqrt{3}) : (2 - \sqrt{3})$
(2) $(2 - \sqrt{3}) : (2 + \sqrt{3})$
(3) $(3 + \sqrt{2}) : (3 - \sqrt{2})$
(4) $(3 - \sqrt{2}) : (3 + \sqrt{2})$
(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

85. 12 monkeys can eat 12 bananas in 12 minutes. In how many minutes can 4 monkeys eat 4 bananas ?
(1) 10 (2) 12
(3) 4 (4) 8
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

86. What must be added to each term of the ratio 2 : 5 so that it may equal to 5 : 6 ?
(1) 65 (2) 78
(3) 13 (4) 12
(SSC CGL Tier-I Exam, 16.08.2015 (Ist Sitting) TF No. 3196279)

87. If A : B = 2 : 3 and B : C = 3 : 7, then A + B : B + C : C + A is
(1) 4 : 8 : 9 (2) 5 : 8 : 9
(3) 5 : 10 : 9 (4) 4 : 10 : 9
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

88. If $(x^3 - y^3) : (x^2 + xy + y^2) = 5 : 1$ and $(x^2 - y^2) : (x - y) = 7 : 1$, then the ratio $2x : 3y$ equals
(1) 4 : 1 (2) 2 : 3
(3) 4 : 3 (4) 3 : 2
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

89. If A : B = 2 : 1 and A : C = 1 : 3, then A : B : C is
(1) 1 : 3 : 2 (2) 1 : 2 : 6
(3) 3 : 2 : 1 (4) 2 : 1 : 6
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 20.12.2015 (Ist Sitting) TF No. 9692918)

90. The mean proportion of 1.21 and 0.09 is
(1) 3.3 (2) 0.33
(3) 3.03 (4) 0.033
(SSC Constable (GD) Exam, 04.10.2015, Ist Sitting)

91. The numbers x, y and z are respectively proportional to 2, 3 and 5 and the sum of x, y and z is 80. If the number z is given by the equation $z = ax - 8$, then a is
(1) 6 (2) $\frac{3}{2}$
(3) 3 (4) $\frac{5}{2}$
(SSC CGL Tier-I (CBE) Exam.10.09.2016)

92. Rs. 2420 were divided among A, B and C so that A : B = 5 : 4 and B : C = 9 : 10 then C gets
(1) Rs. 680 (2) Rs. 800
(3) Rs. 900 (4) Rs. 950
(SSC CGL Tier-II Online Exam.01.12.2016)

93. Among 132 examinees of a certain school, the ratio of successful to unsuccessful students is 9 : 2. Had 4 more students passed, then the ratio of successful to unsuccessful students would have been
(1) 14 : 3 (2) 14 : 5
(3) 28 : 3 (4) 28 : 5
(SSC CGL Tier-II Online Exam.01.12.2016)

94. In a regiment the ratio between the number of officers to soldiers was 3 : 31 before battle. In a battle 6 officers and 22 soldiers were killed and the ratio became 1 : 13, the number of officers in the regiment before battle was
(1) 31 (2) 38
(3) 21 (4) 28
(SSC CGL Tier-II Online Exam.01.12.2016)

95. The ratio of number of boys and girls in a school of 720 students is 7 : 5. How many more girls should be admitted to make the ratio 1 : 1 ?
(1) 90 (2) 120
(3) 220 (4) 240
(SSC CHSL (10+2) Tier-I (CBE) Exam. 08.09.2016) (Ist Sitting)

96. The number of pupils of a class is 55. The ratio of the number of male pupils to the number of female pupils is 5: 6. The number of female pupils is
(1) 11 (2) 25
(3) 30 (4) 35
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (Ist Sitting)

97. In a parade of school students, the number of boys and girls are in the ratio of 9 : 7 respectively and the number of students is 256. Find the number of girls.
(1) 102 (2) 112
(3) 118 (4) 128
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (IInd Sitting)

98. Sum of two numbers is thrice their difference. Their ratio is
(1) 1:2 (2) 2:1
(3) 3:1 (4) 1:3
(SSC CGL Tier-I (CBE) Exam. 07.09.2016) (Ist Sitting)

99. The compound ratio of the inverse ratios of the ratios $x : yz$, $y : zx$, $z : xy$ is :
(1) $1 : xyz$ (2) $xyz : 1$
(3) 1 : 1 (4) $x : yz$
(SSC CGL Tier-I (CBE) Exam. 30.08.2016) (IInd Sitting)

100. If $\left(x+\frac{1}{x}\right) : \left(x-\frac{1}{x}\right) = 5 : 3$, then the value(s) of x is/are
(1) ±1 (2) ±2
(3) ±3 (4) 0
(SSC CGL Tier-I (CBE) Exam. 31.08.2016) (IInd Sitting)

101. If the three numbers in the ratio 3 : 2 : 5 be such that the sum of the squares is equal to 1862 then which number is the middle one ?
(1) 16 (2) 14
(3) 13 (4) 15
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

102. If $2r = h + \sqrt{r^2 + h^2}$ then the ratio $r : h\ (r \neq 0)$ is
(1) 1 : 2 (2) 2 : 3
(3) 4 : 3 (4) 3 : 5
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

103. A box of sweets was distributed between A and B in the ratio 3 : 4. If A got 36 sweets, what was the total number of sweets?
(1) 12 (2) 84
(3) 144 (4) 27
(SSC CGL Tier-I (CBE) Exam. 03.09.2016 (IInd Sitting)

104. In a college union, there are 48 students. The ratio of the number of boys to the number of girls is 5 : 3. The number of girls to be added in the union, so that the ratio of boys to girls in 6 : 5 is
(1) 6 (2) 7
(3) 12 (4) 17
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

105. In a coloured picture of blue and yellow color, blue and yellow colour is used in the ratio of 4 : 3 respectively. If in upper half, blue : yellow is 2 : 3, then in the lower half blue : yellow is
(1) 1 : 1 (2) 2 : 1
(3) 26 : 9 (4) 9 : 26
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

TYPE–II

1. To get the ratio $p : q$ (for $p \neq q$), one has to add a number to each term of the ratio $x : y$, the number is
(1) $\frac{px+qy}{p-q}$ (2) $\frac{qx-py}{p-q}$
(3) $\frac{px-qy}{p-q}$ (4) $\frac{py-qx}{p-q}$
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (North Zone)

2. If $x : y = 3 : 4$, then the value of $(4x - y) : (2x + 3y)$ is
(1) 4 : 9 (2) 8 : 9
(3) 4 : 3 (4) 8 : 3
(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (East Zone)

3. If $x : y = 3 : 4$ and $y : z = 3 : 4$, then $\frac{x+y+z}{3z}$ is equal to
(1) $\frac{13}{27}$ (2) $\frac{1}{2}$
(3) $\frac{73}{84}$ (4) $\frac{37}{48}$
(SSC CHSL DEO & LDC Exam. 10.11.2013, IInd Sitting)

4. If A : B = $\frac{1}{2} : \frac{1}{3}$, B : C = $\frac{1}{5} : \frac{1}{3}$, then (A + B) : (B + C) is equal to
(1) 5 : 8 (2) 9 : 10
(3) 15 : 16 (4) 6 : 15
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

5. If $\frac{x}{y} = \frac{3}{4}$, the ratio of $(2x + 3y)$ and $(3y - 2x)$ is
(1) 2 : 1 (2) 3 : 2
(3) 1 : 1 (4) 3 : 1
(SSC CGL Tier-I Exam, 09.08.2015 (IInd Sitting) TF No. 4239378)

6. Two numbers are in the ratio $1\frac{1}{2} : 2\frac{2}{3}$, when each of these is increased by 15, they are in the ratio $1\frac{2}{3} : 2\frac{1}{2}$. The greater of the numbers
(1) 27 (2) 36
(3) 48 (4) 64
(SSC CPO SI, ASI Online Exam.05.06.2016) (IInd Sitting)

7. If 177 is divided into 3 parts in the ratio $\frac{1}{2} : \frac{2}{3} : \frac{4}{5}$, then the second part is
(1) 75 (2) 45
(3) 72 (4) 60
(SSC CGL Tier-I (CBE) Exam. 01.09.2016) (Ist Sitting)

8. A and B together have Rs. 6300. If $\frac{5}{19}$ th of A's amount is equal to $\frac{2}{5}$ th of B's amount. The amount of 'B' is
(1) Rs. 2500 (2) Rs. 3800
(3) Rs. 2300 (4) Rs. 4000
(SSC CGL Tier-I (CBE) Exam. 06.09.2016) (Ist Sitting)

9. Find the fraction which bears the same ratio to $\frac{1}{27}$ that $\frac{3}{7}$ does to $\frac{5}{9}$.

(1) $\frac{5}{9}$ (2) $\frac{1}{35}$

(3) $\frac{45}{7}$ (4) $\frac{7}{45}$

(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

10. Rs. 782 is divided into three parts in the ratio $\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$, the first part is

(1) Rs. 182 (2) Rs. 204

(3) Rs. 190 (4) Rs. 196

(SSC CGL Tier-I (CBE) Exam. 03.09.2016 (IInd Sitting)

11. The reciprocals of the squares of the numbers $1\frac{1}{2}$ and $1\frac{1}{3}$. are in the ratio

(1) 64 : 81 (2) 8 : 9

(3) 81 : 64 (4) 9 : 85

(SSC CGL Tier-I (CBE) Exam. 08.09.2016 (IInd Sitting)

TYPE–III

1. There is a ratio of 5 : 4 between two numbers. If 40 per cent of the first is 12, then 50% of the second number is

(1) 12 (2) 24

(3) 18 (4) 20

(SSC Graduate Level Tier-II Exam.16.09.2012)

2. A milkman makes 20% profit by selling milk mixed with water at ₹ 9 per litre. If the cost price of 1 litre pure milk is ₹ 10, then the ratio of milk and water in the mixture is

(1) 3 : 1 (2) 4 : 1

(3) 3 : 2 (4) 4 : 3

(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

3. A man ordered 4 pairs of black socks and some pairs of brown socks. The price of a 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 :

(1) 2 : 1 (2) 1 : 4

(3) 1 : 2 (4) 4 : 1

(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

4. The ratio of the number of boys and girls in a school is 8 : 12. If 50% of boys and 25% of girls are getting scholarships for their studies, what is the percentage of school students who are not getting any scholarships ?

(1) 65 (2) 66

(3) 67 (4) 68

(SSC CPO Exam. 06.06.2016) (Ist Sitting)

5. In an ornament the ratio of gold and copper is 3 : 2. The percentage of gold in the ornament is :

(1) 60 (2) 40

(3) 30 (4) 20

(SSC CGL Tier-I (CBE) Exam. 07.09.2016 (IIIrd Sitting)

TYPE–IV

1. The ratio of ages of two students is 3 : 2. One is older to the other by 5 years. What is the age of the younger student ?

(2) 2 years (2) 10 years

(3) $2\frac{1}{2}$ years (4) 15 years

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

2. 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 ?

(1) 1 : 4 (2) 2 : 3

(3) 3 : 5 (4) 5 : 6

(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

3. 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

(1) 5 : 3 (2) 4 : 3

(3) 10 : 7 (4) 3 : 5

(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

4. Four years ago, the ratio of A's age to B's age was 11 : 14 and four years later their age will be in the ratio 13 : 16. The present age of A is

(1) 48 years (2) 26 years

(3) 44 years (4) 28 years

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

5. At present, the ratio of the age of Maya and Chhaya is 6 : 5 and fifteen years from now, the ratio will get changed to 9 : 8. Maya's present age is

(1) 21 years (2) 24 years

(3) 30 years (4) 40 years

(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

6. 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

(1) 1 : 2 (2) 3 : 5

(3) 3 : 4 (4) 2 : 5

(SSC CGL Tier-1 Exam. 26.06.2011 (Second Sitting)

7. The ratio of the age of a father to that of his son is 5: 2. If the product of their ages in years is 1000, then the father's age (in years) after 10 years will be :

(1) 50 (2) 60

(3) 80 (4) 100

(SSC CHSL DEO & LDC Exam. 28.11.2010 (Ist Sitting)

8. 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

(1) 2 : 3 (2) 1 : 2

(3) 4 : 3 (4) 3 : 4

(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

9. Harsha is 40 years old and Ritu is 60 years old. How many years ago was the ratio of their ages 3 : 5 ?

(1) 10 years (2) 20 years

(3) 37 years (4) 5 years

(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

10. 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 ?

(1) 1 : 4 (2) 2 : 3

(3) 3 : 5 (4) 5 : 6

(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

11. Four years ago, the ratio of the age of A and B was 2 : 3 and after four years it will become 5 : 7. Find their present age.
(1) 36 years and 40 years
(2) 32 years and 48 years
(3) 40 years and 56 years
(4) 36 years and 52 years
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

12. The average age of boys in the class is twice the number of girls in the class. The ratio of boys and girls in the class of 50 is 4 : 1. The total of the ages (in years) of the boys in the class is
(1) 2000 (2) 2500
(3) 800 (4) 400
(SSC CGL Tier-I Exam. 19.10.2014 TF No. 022 MH 3)

13. 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
(1) $\frac{22}{24}$ (2) $\frac{15}{16}$
(3) $\frac{17}{18}$ (4) $\frac{11}{12}$
(SSC CPO S.I. Exam. 07.09.2003 & SSC CHSL DEO & LDC Exam. 20.10.2013)

14. 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 :
(1) 3 years (2) 6 years
(3) 9 years (4) 4 years
(SSC CPO S.I. Exam. 26.05.2005)

15. 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 today, is
(1) 1 : 2 (2) 1 : 3
(3) 2 : 3 (4) 2 : 5
(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (Second Sitting)

16. The ratio of the present age of Rahul and Rashmi is 2 : 1. The ratio of their age after 30 years will be 7 : 6. What is the present age of Rahul ?
(1) 6 years (2) 10 years
(3) 12 years (4) 20 years
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

17. The present age of A and B are in the ratio 4 : 5 and after 5 years they will be in the ratio 5 : 6. The present age of A is
(1) 10 years (2) 20 years
(3) 25 years (4) 40 years
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

18. 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
(1) 4 (2) 7
(3) 6 (4) 3
(SSC Multi-Tasking Staff Exam. 17.03.2013, IInd Sitting)

19. 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
(1) 2 : 3 (2) 1 : 2
(3) 4 : 3 (4) 3 : 4
(SSC CHSL DEO & LDC Exam. 28.10.2012, Ist Sitting)

20. 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
(1) 110 (2) 100
(3) 70 (4) 40k
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014

21. My grandfather was 9 times older than me 16 years ago. He will be 3 times of my age 8 years from now. Eight years ago, the ratio of my age to that of my grandfather was
(1) 3 : 8 (2) 2 : 5
(3) 1 : 2 (4) 1 : 5
(SSC CHSL DEO Exam. 02.11.2014 (Ist Sitting) & SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

22. The ratio of the ages of A and B at present is 3:1. Four years earlier the ratio was 4:1. The present age of A is
(1) 48 years (2) 40 years
(3) 36 years (4) 32 years
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

23. Eighteen years ago, the ratio of A's age to B's age was 8 : 13. Their present ratios are 5 : 7. What is the present age of A ?
(1) 60 years (2) 70 years
(3) 50 years (4) 40 years
(SSC CGL Tier-I Exam, 09.08.2015 (Ist Sitting) TF No. 1443088)

24. The ratio of ages of two persons is 5 : 9 and the age of one of them is greater than the other by 40 years. The sum of their ages in year is
(1) 180 (2) 140
(3) 150 (4) 160
(SSC Constable (GD) Exam, 04.10.2015, Ist Sitting)

25. 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's current age is :
(1) 5 years (2) 3 years
(3) 9 years (4) 15 years
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

26. If 4 years ago the ratio between the ages of P and Q was 5 : 6 and the sum of their ages at present is 52 years, what is the ratio of their present ages ?
(1) 5 : 6 (2) 6 : 7
(3) 7 : 8 (4) 4 : 5
(SSC CPO Exam. 06.06.2016) (Ist Sitting)

27. The present ages of A and B are in the ratio 5 : 6 respectively. After seven years this ratio becomes 6 : 7. Then the present age of A in years is :
(1) 35 years (2) 32 years
(3) 33 years (4) 30 years
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 20.03.2016) (IInd Sitting)

28. The ratio of the present ages of two boys is 3:4. After 3 years, the ratio of their ages is equal to will be 4:5.The ratio of their ages after 21 years will be
(1) 14:17 (2) 17:19
(3) 11:12 (4) 10:11
(SSC CGL Tier-I (CBE) Exam. 04.09.2016) (Ist Sitting)

29. The ratio of A's age to B's age is 4 : 3. 'A' will be 26 years old after 6 years. The age of B now is :

(1) $19\frac{1}{2}$ years

(2) 12 years

(3) 21 years (4) 15 years

(SSC CGL Tier-I (CBE) Exam. 08.09.2016 (IIIrd Sitting)

30. The present ages of A and B are in the ratio 3 : 4. Ten years ago, this ratio was 4 : 7. The present ages of A and B are respectively :

(1) 18 years, 27 years

(2) 21 years, 28 years

(3) 24 years, 32 years

(4) 27 years, 36 years

(SSC CGL Tier-I (CBE) Exam. 27.10.2016 (Ist Sitting)

TYPE–V

1. The ratio of two numbers is 3 : 8 and their difference is 115. The smaller of the two numbers is :

(1) 184 (2) 194

(3) 69 (4) 59

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

2. Four numbers are in the ratio 1 : 2 : 3 : 4. Their sum is 16. The sum of the first and fourth number is equal to :

(1) 5 (2) 8

(3) 10 (4) 80

(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

3. The sum of two numbers is 40 and their difference is 4. The ratio of the numbers is :

(1) 21 : 19 (2) 22 : 9

(3) 11 : 9 (4) 11 : 18

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

4. The ratio of two numbers is 10 : 7 and their difference is 105. The sum of these numbers is

(1) 595 (2) 805

(3) 1190 (4) 1610

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

5. The product of two positive integers is 1575 and their ratio is 9 : 7. The smaller integer is

(1) 25 (2) 35

(3) 45 (4) 70

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

6. Three numbers are in the ratio of 3 : 2 : 5 and the sum of their squares is 1862. The smallest of these numbers is

(1) 24 (2) 21

(3) 14 (3) 35

(SSC CPO S.I. Exam. 12.01.2003

7. The sum of three numbers is 116. The ratio of second to the third is 9 : 16 and the first to the third is 1 : 4. The second number is

(1) 30 (2) 32

(3) 34 (4) 36

(SSC CPO S.I. Exam. 07.09.2003)

8. 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

(1) 49 (2) 48

(3) 30 (4) 20

(SSC CPO S.I. Exam. 07.09.2003)

9. 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

(1) 10 litres (2) 21 litres

(3) 35 litres (4) 45 litres

(SSC CPO S.I. Exam. 05.09.2004)

10. 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 :

(1) 45 (2) 40

(3) 30 (4) 55

(SSC CPO S.I. Exam. 26.05.2005)

11. Two numbers are in the ratio 2 : 3. If 2 is subtracted from the first and 2 is added to the second, the ratio becomes 1 : 2. The sum of the numbers is :

(1) 30 (2) 28

(3) 24 (4) 10

(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

12. Three 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

(1) 72, 84, 108 (2) 60, 72, 96

(3) 72, 84, 96 (4) 72, 96, 108

(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

13. 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

(1) 30 (2) 58

(3) 20 (4) 48

(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

14. When a particular number is subtracted from each of 7, 9, 11 and 15, the resulting numbers are in proportion. The number to be subtracted is :

(1) 1 (2) 2

(3) 3 (4) 5

(SSC CPO S.I. Exam. 16.12.2007)

15. The two numbers are in the ratio 2 : 3 and their product is 96. The sum of the numbers is

(1) 5 (2) 20

(3) 101 (4) 102

(SSC CPO S.I. Exam. 06.09.2009)

16. The ratio between two numbers is 3 : 4. If each number is increased by 6, the ratio becomes 4 : 5. The difference between the numbers is

(1) 1 (2) 3

(3) 6 (4) 8

(SSC CPO S.I. Exam. 06.09.2009)

17. Two numbers are in the ratio 5 : 7. On diminishing each of them by 40, they become in the ratio 17 : 27. The difference of the numbers is :

(1) 18 (2) 52

(3) 137 (4) 50

(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

18. Three numbers are in the ratio 5 : 6 : 7. If the product of the numbers is 5670, then the greatest number is

(1) 15 (2) 18

(3) 21 (4) 28

(SSC CPO S.I. Exam. 06.09.2009)

19. Two numbers are in the ratio 1 : 3. If their sum is 240, then their difference is

(1) 120 (2) 108

(3) 100 (4) 96

(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

20. If the sum of two quantities is equal to three times their difference, then the ratio of the two quantities is

(1) 1 : 3 (2) 3 : 1

(3) 2 : 1 (4) 2 : 3

(SSC CISF ASI Exam. 29.08.2010 (Paper-1)

21. 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
(1) 20 (2) 27
(3) 39 (4) 52
(SSC CGL Tier-1 Exam. 26.06.2011 (Second Sitting)

22. Which number when added to each of the numbers 6, 7, 15, 17 will make the resulting numbers proportional ?
(1) 6 (2) 5
(3) 4 (4) 3
(SSC Data Entry Operator Exam. 02.08.2009)

23. What number should be added to each of 6, 14, 18 and 38 so that the resulting numbers make a proportion ?
(1) 1 (2) 2
(3) 3 (4) 4
(SSC CHSL DEO & LDC Exam. 27.11.2010)

24. 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
(1) 145 (2) 185
(3) 295 (4) 155
(SSC Multi-Tasking Staff Exam. 10.03.2013, Ist Sitting : Patna)

25. The ratio between a two – digit number and the sum of the digits of that number is 4 : 1. If the digit at the unit's place is 3 more than the digit at the ten's place, then the number is
(1) 47 (2) 69
(3) 36 (4) 25
(SSC Multi-Tasking Staff Exam. 10.03.2013, Ist Sitting : Patna)

26. 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 x. Number of balls are equal in each bag now. Number of balls in each bag now is
(1) 45 (2) 20
(3) 30 (4) 25
(SSC Graduate Level Tier-I Exam. 19.05.2013 Ist Sitting)

27. If the square of the sum of two numbers is equal to 4 times of their product, then the ratio of these numbers is :
(1) 2 : 1 (2) 1 : 3
(3) 1 : 1 (4) 1 : 2
(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

28. Three numbers are in the ratio 2 : 3 : 4. If the sum of their squares is 1856, then the numbers are
(1) 8, 12 and 16
(2) 16, 24 and 32
(3) 12, 18 and 24
(4) None of the above
(SSC Graduate Level Tier-II Exam. 29.09.2013)

29. The number to be added to each of the numbers 7, 16, 43, 79 to make the numbers in proportion is
(1) 2 (2) 3
(3) 5 (4) 1
(SSC Graduate Level Tier-I Exam. 11.11.2012, Ist Sitting)

30. The average of two numbers is 62. If 2 is added to the smallest number, the ratio between the numbers becomes 1 : 2. The difference of the numbers is
(1) 62 (2) 40
(3) 84 (4) 44
FCI Assistant Grade-III Exam. 25.02.2012 (Paper-I)
North Zone (Ist Sitting)

31. What number should be subtracted from both terms of the ratio 15 : 19 in order to make it 3 : 4 ?
(1) 9 (2) 6
(3) 5 (4) 3
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

32. The sum of two numbers is equal to 20 and their difference is 25. The ratio of the two numbers is
(1) 9 : 1 (2) 7 : 9
(3) 3 : 5 (4) 2 : 7
(SSC CGL Tier-II Exam. 21.09.2014)

33. Two numbers are in the ratio of 2 : 3. If their sum is 125, find the numbers.
(1) 50, 75 (2) 24, 36
(3) 20, 30 (4) 32, 78
(SSC CHSL DEO Exam. 16.11.2014 (Ist Sitting)

34. The ratio of three positive numbers is 2 : 3 : 5 and the sum of their squares is 608. The three numbers are
(1) 2, 3, 5 (2) 10, 15, 25
(3) 8, 12, 20 (4) 4, 6, 10
(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

35. If the product of two positive numbers is 1575 and their ratio is 7 : 9, then the greater number is
(1) 45 (2) 35
(3) 135 (4) 63
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

36. If A and B are in the ratio 4 : 5 and the difference of their squares is 81, what is the value of A ?
(1) 45 (2) 12
(3) 36 (4) 15
(SSC CGL Tier-I Exam, 16.08.2015 (Ist Sitting) TF No. 3196279)

37. If two numbers are in the ratio 2 : 3 and the ratio becomes 3 : 4 when 8 is added to both the numbers, then the sum of the two numbers is
(1) 10 (2) 80
(3) 40 (4) 100
(SSC CGL Tier-I Exam, 16.08.2015 (IInd Sitting) TF No. 2176783)

38. Two numbers are in ratio 5 : 8. If their difference is 48, then the smaller number is
(1) 80 (2) 96
(3) 128 (4) 64
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 20.12.2015 (Ist Sitting) TF No. 9692918)

39. Three numbers are in the ratio 5:7:12. If the sum of the first and the third numbers is greater than the second number by 50. The sum of the three numbers is
(1) 125 (2) 120
(3) 95 (4) 85
(SSC CGL Tier-I (CBE) Exam. 30.08.2016) (Ist Sitting)

40. Two numbers whose sum is 84 can not be in the ratio
(1) 5 : 7 (2) 13 : 8
(3) 1 : 3 (4) 3 : 2
(SSC CGL Tier-I (CBE) Exam. 06.09.2016 (IInd Sitting)

41. Two numbers are in the ratio 3 : 5. If 6 is added to each of them, the ratio becomes 2 : 3. The numbers are
(1) 21 and 35 (2) 30 and 50
(3) 24 and 40 (4) 18 and 30
(SSC CGL Tier-I (CBE) Exam. 10.09.2016 (IIIrd Sitting)

42. The sum of three numbers is 540. The ratio of second to third is 9 : 13 and that of first to third is 2 : 7. The third number is :
(1) 273 (2) 280
(3) 250 (4) 286
(SSC CGL Tier-I (CBE) Exam. 27.10.2016 (Ist Sitting)

TYPE–VI

1. Two numbers are in the ratio 4 : 5 and their L.C.M. is 180. The smaller number is
(1) 9 (2) 15
(3) 36 (4) 45
(SSC CPO S.I. Exam. 16.12.2007)

2. Two numbers are in the ratio 3 : 4 and their LCM is 180. The first number is
(1) 15 (2) 60
(3) 36 (4) 45
(SSC SAS Exam. 26.06.2010 (Paper-1)

3. Two numbers are in the ratio 3 : 5 and their LCM is 225. The smaller number is
(1) 45 (2) 60
(3) 75 (4) 90
(SSC CPO S.I. Exam. 12.12.2010 (Paper-I)

4. The ratio of two numbers is 3 : 4 and their LCM is 48. The sum of the two numbers is :
(1) 32 (2) 28
(3) 26 (4) 24
(SSC CHSL DEO & LDC Exam. 28.11.2010 (Ist Sitting)

5. The ratio of two numbers is 3 : 4 and their LCM is 120. The sum of numbers is
(1) 105 (2) 140
(3) 70 (4) 35
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 01.11.2015, IInd Sitting)

6. The ratio of two numbers is 3 : 4 and their HCF is 15. Then the sum of the two numbers is :
(1) 105 (2) 115
(3) 120 (4) 110
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (Ist Sitting) TF No. 1375232)

TYPE–VII

1. A and B have money in the ratio 2 : 1. If A gives ₹ 2 to B, the money will be in the ratio 1 : 1. What were the initial amounts they had?
(1) ₹ 12 and ₹ 6
(2) ₹ 16 and ₹ 8
(3) ₹ 8 and ₹ 4
(4) ₹ 6 and ₹ 3
(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

2. 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 are admitted?
(1) 91 : 81 (2) 81 : 91
(3) 9 : 10 (4) 10 : 9
(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

3. Two numbers are in the ratio $1\frac{1}{2} : 2\frac{2}{3}$. When each of these is increased by 15, they become in the ratio $1\frac{2}{3} : 2\frac{1}{2}$. The greater of the numbers is :
(1) 27 (2) 36
(3) 48 (4) 64
(SSC CGL Prelim Exam. 24.02.2002 & 13.11.2005 (IInd Sitting)

4. 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 :
(1) 100 (2) 180
(3) 200 (4) 400
(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

5. 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
(1) 6 (2) 12
(3) 15 (4) 18
(SSC CPO S.I. Exam. 12.01.2003

6. 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.
(1) 27 (2) 33
(3) 49 (4) 55
(SSC Section Officer (Commercial Audit) Exam. 16.11.2003)

7. The ratio of number of boys to that of girls in a group becomes 2:1 when 15 girls leave. But, afterwards, when 45 boys also leave, the ratio becomes 1 : 5. Originally the number of girls in the group was
(1) 20 (2) 30
(3) 40 (4) 50
(SSC CPO S.I. Exam. 05.09.2004)

8. 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 :
(1) 50 (2) 90
(3) 100 (4) 150
(SSC CGL Prelim Exam. 24.02.2002, 13.11.2005 (Ist Sitting) & 04.02.2007 (IInd sitting), & SSC CHSL DEO & LDC Exam. 28.10.2012)

9. 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?
(1) 7 : 6 (2) 6 : 7
(3) 10 :11 (4) 13 :14
(SSC CPO S.I. Exam. 03.09.2006)

10. 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
(1) 36 (2) 32
(3) 24 (4) 16
(SSC CPO S.I. Exam. 03.09.2006)

11. In a school having roll strength 286, the ratio of boys and girls is 8 : 5. If 22 more girls get admitted into the school, the ratio of boys and girls becomes
(1) 12 : 7 (2) 10 : 7
(3) 8 : 7 (4) 4 : 3
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

12. The number of students in three classes are in the ratio 2 : 3 : 4. If 12 students are increased in each class, this ratio changes to 8 : 11 :14. The total number of students in the three classes at the beginning was
(1) 162 (2) 108
(3) 96 (4) 54
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

13. What must be added to each term of the ratio 7 : 11, so as to make it equal to 3 : 4 ?
(1) 8 (2) 7.5
(3) 6.5 (4) 5
(SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

14. Two numbers are in the ratio 7 : 11. If 7 is added to each of the numbers, the ratio becomes 2 : 3. The smaller number is
(1) 39 (2) 49
(3) 66 (4) 77
(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

15. Two numbers are in the ratio 3 : 5. If each number is increased by 10, the ratio becomes 5 :7. The smaller number is
(1) 9 (2) 12
(3) 15 (4) 25
(SSC (South Zone) Investigator Exam. 12.09.2010)

16. The ratio between two numbers is 2 : 3. If each number is increased by 4, the ratio between them becomes 5 : 7. The difference between the numbers is
(1) 8 (2) 6
(3) 4 (4) 2
(SSC CGL Tier-1 Exam. 19.06.2011 (Second Sitting)

17. What number should be added to or subtracted from each term of the ratio 17 : 24 so that it becomes equal to 1 : 2 ?
(1) 5 is subtracted
(2) 10 is added
(3) 7 is added
(4) 10 is subtracted
(SSC CGL Tier-1 Exam. 26.06.2011 (First Sitting)

18. 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
(1) 36 (2) 48
(3) 56 (4) 64
(SSC Constable (GD) & Rifleman (GD) Exam. 22.04.2012 (Ist Sitting)

19. 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
(1) 95 (2) 76
(3) 100 (4) 114
(SSC Graduate Level Tier-II Exam.16.09.2012)

20. The total number of students in a school was 660. The ratio between boys and girls was 13 : 9. After some days, 30 girls joined the school and some boys left the school and new ratio between boys and girls became 6 : 5. The number of boys who left the school is :
(1) 50 (2) 40
(3) 30 (4) 60
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

21. 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
(1) 6 : 5 (2) 5 : 6
(3) 3 : 7 (4) 3 :5
(SSC CHSL DEO & LDC Exam. 04.11.2012 (IInd Sitting)

22. 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.
(1) 15, 28 (2) 36, 115
(3) 33, 55 (4) 60, 69
(SSC Delhi Police S.I. (SI) Exam. 19.08.2012)

23. 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:
(1) 10, 20, 30 (2) 15, 30, 45
(3) 1, 2, 3 (4) 5, 10, 15
(SSC Graduate Level Tier-I Exam. 21.04.2013, Ist Sitting)

24. 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 ?
(1) 30 (2) 60
(3) 72 (4) 90
(SSC Graduate Level Tier-II Exam. 29.09.2013)

25. What number should be subtracted from both the terms of the ratio 11 : 15 so as to make it as 2 : 3 ?
(1) 2 (2) 3
(3) 4 (4) 5
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

26. Two numbers are in the ratio of 3 : 5. If 9 is subtracted from each then they are in the ratio 12 : 23. The smaller number is
(1) 55 (2) 33
(3) 28 (4) 36
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

27. The average of 11 numbers is 36, whereas average of 9 of them is 34. If the remaining two numbers are in the ratio of 2 : 3, find the value of the smaller number (between remaining two numbers).
(1) 45 (2) 48
(3) 54 (4) 36
(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

28. The ratio of number of boys to the number of girls in a school of 432 pupils is 5 : 4. When some new boys and girls are admitted, the number of boys increase by 12 and the ratio of the boys to girls changes to 7 : 6. The number of new girls admitted is
(1) 12 (2) 14
(3) 24 (4) 20
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

29. If the ratio of two numbers is 1 : 5 and their product is 320, then the difference between the squares of these two numbers is :
(1) 1024 (2) 1256
(3) 1536 (4) 1435
(SSC CGL Tier-I (CBE) Exam. 06.09.2016 (IIIrd Sitting)

30. The ratio of two positive numbers is 3 : 4. The sum of their squares is 400. What is the sum of the numbers ?
(1) 28 (2) 22
(3) 24 (4) 26
(SSC CGL Tier-I (CBE) Exam. 10.09.2016 (IInd Sitting)

31. Three numbers are in the ratio 1 : 2 : 3 and the sum of their cubes is 4500 . The smallest number is
(1) 4 (2) 5
(3) 6 (4) 10
(SSC CGL Tier-I (CBE) Exam. 11.09.2016 (IInd Sitting)

TYPE–VIII

1. 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?
(1) $133\frac{1}{3}$ (2) $\frac{1}{200}$
(3) 72 (4) 66
(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

2. The ratio of copper and zinc in brass is 13 : 7. How much zinc will be there in 100 kg of brass ?
(1) 20 kg. (2) 55 kg.
(3) 35 kg. (4) 40 kg.
(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

3. 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 ?
(1) 10 litres (2) 15 litres
(3) 18 litres (4) 12 litres
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

4. In an alloy, the ratio of copper and zinc is 5 : 2. If 1.250 kg of zinc is mixed in 17 kg 500 g of alloy, then the ratio of copper and zinc will be
(1) 2 : 1 (2) 2 : 3
(3) 3 : 2 (4) 1 : 2
(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

5. There are three containers of equal capacity. The ratio of Sulphuric acid to water in the first container is 3 : 2, that in the second container is 7 : 3 and in the third container it is 11 : 4. If all the liquids are mixed together, then the ratio of Sulphuric acid to water in the mixture will be :
(1) 61 : 29 (2) 61 : 28
(3) 60 : 29 (4) 59 : 29
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

6. 200 litres 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
(1) 20 litres (2) 40 litres
(3) 60 litres (4) 80 litres
(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

7. A can contains a mixture of two liquids A and B in the ratio 7 : 5. When 9 litres of mixture are drawn off and the can is filled with B, the ratio of A and B becomes 7 : 9. Litres of liquid A contained by the can initially was
(1) 10 (2) 20
(3) 21 (4) 25
(SSC CGL Tier-1 Exam. 26.06.2011 (First Sitting)

8. A container contains two liquids A and B in the ratio 7 : 5. When 9 litres of mixture are drawn off and the container is filled with B, the ratio of A and B becomes 1:1. How many litres of liquid A was in the container initially ?
(1) 26 (2) $16\frac{1}{2}$
(3) $36\frac{3}{4}$ (4) $26\frac{3}{4}$
(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (East Zone)

9. 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 ;
(1) 7 : 5 (2) 5 : 9
(3) 9 : 5 (4) 5 : 7
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

10. The ratio in which a man must mix rice at ₹ 10.20 per kg and ₹ 14.40 per kg so as to make a mixture worth ₹ 12.60 per kg, is
(1) 4 : 3 (2) 2 : 5
(2) 18 : 24 (4) 3 : 4
(SSC Multi-Tasking Staff Exam. 17.03.2013, IInd Sitting)

11. 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
(1) 10 litres (2) 12 litres
(3) 8 litres (4) 9 litres
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

12. A vessel is filled with liquid, 3 parts of which are water and 5 parts syrup. How much of the mixture must be drawn off and replaced with water so that the mixture may be half water and half syrup ?
(1) $\frac{1}{3}$ (2) $\frac{1}{4}$
(3) $\frac{1}{5}$ (4) $\frac{1}{7}$
(SSC Delhi Police S.I. (SI) Exam. 19.08.2012)

13. Two 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
(1) 7 : 5 (2) 6 : 5
(3) 5 : 6 (4) 4 : 3
(SSC CHSL DEO& LDC Exam. 28.10.2012 (Ist Sitting) & (SSC MTS Exam. 17.03.2013 (Kolkata) 11.11.2011 & 04.02.2011)

14. A container contains 60 kg of milk. From this container 6 kg of milk was taken out and replaced by water. This process was repeated further two times. The amount of milk left in the container is
(1) 34.24 kg (2) 39.64 kg
(3) 43.74 kg (4) 47.6 kg
(SSC CHSL DEO & LDC Exam. 28.10.2012, Ist Sitting)

15. The proportion of acid and water in three samples is 2 : 1, 3 : 2 and 5 : 3. A mixture containing equal quantities of all three samples is made. The ratio of water and acid in the mixture is :
(1) 120 : 133 (2) 227 : 133
(3) 227 : 120 (4) 133 : 227
(SSC CAPFs SI & CISF ASI Exam. 23.06.2013)

16. Two alloys are both made up of copper and tin. The ratio of copper and 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 ?
(1) 3 : 5 (2) 4 : 7
(3) 3 : 8 (4) 5 : 11
(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

17. A mixture contains alcohol and water in the ratio 4 : 3. If 5 litres of water is added to the mixture, the ratio becomes 4 : 5. The quantity of alcohol in the given mixture is
(1) 3 litres (2) 4 litres
(3) 15 litres (4) 10 litres
(SSC CHSL DEO & LDC Exam. 27.10.2013 IInd Sitting)

18. In two alloys A and B, the ratio of zinc to tin is 5 : 2 and 3 : 4 respectively. Seven 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 ?
(1) 2 : 1 (2) 1 : 2
(3) 2 : 3 (4) 1 : 1
(SSCCHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

19. 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?

(1) 50 (2) 66

(3) 72 (4) 200

(SSC CHSL DEO & LDC Exam. 10.11.2013, IInd Sitting)

20. 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 $69\frac{3}{13}\%$ milk is:

(1) 3 : 5 (2) 5 : 2

(3) 5 : 7 (4) 2 : 7

(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

21. A mixture of 30 litres contain 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 becomes 3 : 7 ?

(1) 40 litres (2) 49 litres

(3) 56 litres (4) 63 litres

(SSC CPO S.I. Exam. 07.09.2003)

22. 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 in the barrel becomes 1 : 1 ?

(1) $\frac{1}{4}$ (2) $\frac{1}{3}$

(3) $\frac{3}{4}$ (4) $\frac{2}{3}$

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

23. 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?

(1) 1 : 2 (2) 1 : 1

(3) 2 : 1 (4) 4 : 5

(SSC Section Officer (Commercial Audit) Exam. 25.09.2005)

24. 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 ?

(1) 5 (2) 6

(3) 8 (4) 4

(SSC Section Officer (Commercial Audit) Exam. 25.09.2005)

25. Vessels A and B contain mixtures of milk and water in the ratios 4 : 5 and 5 : 1 respectively. In what ratio should quantities of mixture be taken from A and B to form a mixture in which milk to water is in the ratio 5 : 4?

(1) 2 : 5 (2) 4 : 3

(3) 5 : 2 (4) 2 : 3

(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (Second Sitting)

26. The milk and water in a mixture are 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

(1) 35 litres (2) 40 litres

(3) 60 litres (4) 96 litres

(SSC CPO S.I. Exam. 16.12.2007)

27. In a 729 litres mixture of milk and water, the ratio of milk to water is 7 : 2. To get a new mixture containing milk and water in the ratio 7 : 3, the amount of water to be added is

(1) 81 litres (2) 71 litres

(3) 56 litres (4) 50 litres

(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

28. 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

(1) 6 (2) $6\frac{1}{2}$

(3) $6\frac{2}{3}$ (4) $6\frac{3}{4}$

(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

29. 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

(1) 4 litres (2) 8 litres

(3) 16 litres (4) 40 litres

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

30. 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

(1) 45 litres (2) 60 litres

(3) 75 litres (4) 80 litres

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

31. 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 these alloys are melted to form a third alloy C. The ratio of gold and copper in the alloy C is

(1) 25 : 33 (2) 33 : 25

(3) 15 : 17 (4) 17 : 15

(SSC CPO S.I. Exam. 09.11.2008)

32. A mixture contains wine and water in the ratio 3 : 2 and another mixutre contains them in the ratio 4 : 5. How many litres of the later must be mixed with 3 litres of the former so that the resulting mixture may contain equal quantities of wine and water ?

(1) $5\frac{2}{5}$ litres (2) $5\frac{2}{3}$ litres

(3) $4\frac{1}{2}$ litres (4) $3\frac{3}{4}$ litres

(SSC SAS Exam. 26.06.2010 (Paper-1)

33. The ratio of the volume of water and glycerine in 240cc of a 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

(1) 55 cc (2) 60 cc

(3) 62.5 cc (4) 64 cc

(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

34. The ratio of the quantities of an acid and water in a mixture is 1 : 3. If 5 litres of acid is further added to the mixture, the new ratio becomes 1 : 2. The quantity of new mixture (in litres) is

(1) 32 (2) 40

(3) 42 (4) 45

(SSC CGL Tier-1 Exam. 19.06.2011 (Second Sitting)

35. In a mixture of 25 litres, the ratio of acid to water is 4 : 1. Another 3 litres of water is added to the mixture. The ratio of acid to water in the new mixture is
(1) 5 : 2 (2) 2 : 5
(3) 3 : 5 (4) 5 : 3
(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011 (Paper-I)

36. 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
(1) 15 : 12 (2) 53 : 59
(3) 20 : 9 (4) 59 : 53
(SSC CGL Tier-1 Exam 19.06.2011 (First Sitting)

37. 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 ?
(1) 13 : 8 (2) 8 :13
(3) 13 :12 (4) 6 : 9
(SSC Data Entry Operator Exam. 31.08.2008)

38. In one 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 ?
(1) 20 : 7 (2) 8 : 3
(3) 27 : 4 (4) 25 : 9
(SSC Data Entry Operator Exam. 02.08.2009)

39. In a mixture of 60 litres, the ratio of milk and water is 2 : 1. How much more water must be added to make its ratio 1 : 2 ?
(1) 40 litres (2) 52 litres
(3) 54 litres (4) 60 litres
(SSC CHSL DEO & LDC Exam. 27.11.2010)

40. 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
(1) 5 : 8 (2) 7 : 8
(3) 7 : 5 (4) 4 : 7
(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (North Zone)

41. 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
(1) 1 : 2 (2) 2 : 1
(3) 2 : 3 (4) 3 : 2
(SSC CHSL DEO & LDC Exam. 04.12.2011 (IInd Sitting (North Zone)

42. Acid and water are mixed in a vessel A in the ratio of 5 : 2 and in 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?
(1) 7: 2 (2) 2: 7
(3) 7: 4 (4) 2: 3
(SSCCHSL DEO & LDC Exam. 04.12.2011(Ist Sitting (East Zone)

43. The ratio of spirit and water in two mixturers of 20 litre and 36 litre 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
(1) 25 : 29 (2) 9 : 10
(3) 27 : 29 (4) 27 : 31
(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (Delhi Zone)

44. Alcohol and water in two vessels A and B are in the ratio 5 : 3 and 5 : 4 respectively. In what ratio, the liquids in both the vessels be mixed to obtain a new mixture in vessel C in the ratio 7 : 5 ?
(1) 2 : 3 (2) 3 : 2
(3) 3 : 5 (4) 2 : 5
(SSC CHSL DEO & LDC Exam. 11.12.2011(IInd Sitting (East Zone)

45. Two vessels contain 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.
(1) 2 : 1 (2) 1 : 2
(3) 4 : 1 (4) 1 : 4
(SSC Graduate Level Tier-II Exam.16.09.2012)

46. 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 ?
(1) 2 : 3 (2) 3 : 4
(3) 1 : 2 (4) 1 : 3
(SSC CHSL DEO & LDC Exam. 21.10.2012 (Ist Sitting)

47. A and B are two alloys of gold and copper in the ratio 7 : 2 and 7:11 respectively. If equal quantities of these two alloys are melted to form a new alloy C, then the ratio of gold and copper in C is
(1) 6 : 5 (2) 9 : 4
(3) 12:7 (4) 7:5
(SSC CHSL DEO & LDC Exam. 04.11.2012 (IInd Sitting)

48. A Can contains a mixture of two liquids A and B in the ratio 7:5. When 9 litres of mixture are drained off and the Can is filled with B, the ratio of A and B becomes 7 : 9. How many litres of liquid A was contained by the Can initially ?
(1) 10 litres (2) 20 litres
(3) 21 litres (4) 25 litres
(SSC CHSL DEO & LDC Exam. 04.11.2012 (IInd Sitting)

49. The ratio of milk and water in mixtures of four containers are 5 : 3, 2 : 1, 3 : 2 and 7 : 4 respectively. In which container is the quantity of milk, relative to water, minimum ?
(1) First (2) Second
(3) Third (4) Fourth
(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

50. 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
(1) 8 (2) 10
(3) 12 (4) 15
(SSC CGL Tier-1 Exam. 26.06.2011 (Second Sitting)

51. 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
(1) 3 : 10 (2) 3 : 7
(3) 10 : 3 (4) 7 : 3
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

52. A liquid 'P' is $1\frac{3}{7}$ times as heavy as water and water is $1\frac{2}{5}$ times as heavy as another liquid 'Q'. The amount of liquid 'P' that must be added to 7 litres of the liquid 'Q' so that the mixture may weigh as much as an equal volume of water, will be

(1) 7 litres (2) $5\frac{1}{6}$ litres

(3) 5 litres (4) $4\frac{2}{3}$ litres

(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

53. The milk and water in two vessels A and B are in the ratio 4 : 3 and 2 : 3 respectively. In what ratio, the liquids in both the vessels be mixed to obtain a new mixture in vessel C containing half milk and half water ?

(1) 7 : 5 (2) 5 : 2
(3) 3 : 11 (4) 1 : 2

(SSC CGL Tier-I Exam. 19.10.2014)

54. There are two containers of equal capacity. The ratio of milk to water in the first container is 3 : 1, in the second container 5 : 2. If they are mixed up, the ratio of milk to water in the mixture will be

(1) 28 : 41 (2) 41 : 28
(3) 15 : 41 (4) 41 : 15

(SSC CGL Tier-II Exam. 21.09.2014)

55. 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

(1) 13 : 17 (2) 19 : 17
(3) 13 : 11 (4) 19 : 11

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014)

56. A vessel full of pure acid contains 10 litres of it, of which 2 litres are withdrawn. The vessel is then filled with water. Next 2 litres of the mixture are withdrawn, and again the vessel is filled up with water. The ratio of the acid left in the vessel with that of the original quantity is

(1) 1 : 5 (2) 4 : 5
(3) 4 : 25 (4) 16 : 25

(SSC CGL Tier-I Exam. 19.10.2014 TF No. 022 MH 3)

57. Gold is 19 times as heavy as water and copper is 9 times as heavy as water. In what ratio should these be mixed to get an alloy 15 times as heavy as water ?

(1) 1 : 1 (2) 1 : 2
(3) 2 : 3 (4) 3 : 2

(SSC CGL Tier-I Exam. 19.10.2014 TF No. 022 MH 3)

58. 80 litres of a mixture contains milk and water in the ratio of 27 : 5. How much more water is to be added to get a mixture containing milk and water in the ratio of 3 : 1 ?

(1) 5 litres (2) 10 litres
(3) 15 litres (4) 20 litres

(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014 , Ist Sitting TF No. 333 LO 2)

59. The ratio of two liquids in a mixture is 3 : 5 and that in another mixture is 6 : 1. The ratio in which these two mixtures should be mixed so as to make the ratio of the liquids 7 : 3 is

(1) 44 : 71 (2) 44 : 81
(3) 44 : 91 (4) 44 : 61

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

60. A vessel contains 20 litres of acid. 4 litres of acid is taken out of the vessel and replaced by the same quantity of water. Next 4 litres of the mixture are withdrawn, and again the vessel is filled with the same quantity of acid left in the vessel with the quantity of acid initially in the vessel is

(1) 4 : 5 (2) 4 : 25
(3) 16 : 25 (4) 1 : 5

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

61. In two blends of mixed tea, the ratios of Darjeeling and Assam tea are 4 : 7 and 2 : 5. The ratio in which these two blends should be mixed to get the ratio of Darjeeling and Assam tea in the new mixture as 6 : 13 is

(1) 22 : 35 (2) 26 : 35
(3) 35 : 78 (4) 13 : 22

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

62. In a mixture of three varieties of tea, the ratio of their weights is 4 : 5 : 8. If 5 kg tea of the first variety, 10 kg tea of the second variety and some quantity of tea of the third variety are added to the mixture, the ratio of the weights of three varieties of tea becomes as 5 : 7 : 9. In the final mixture, the quantity (in kg) of the third variety of tea was

(1) 42 (2) 45
(3) 48 (4) 40

(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

63. Three vessels whose capacities are 3 : 2 : 1 are completely filled with milk mixed with water. The ratio of milk and water in the mixture of vessels are 5 : 2, 4 : 1 and 4 : 1 respectively. Taking $\frac{1}{3}$ of first, $\frac{1}{2}$ of second and $\frac{1}{7}$ of third mixtures, a new mixture kept in a new vessel is prepared. The percentage of water in the new mixture is

(1) 28 (2) 32
(3) 30 (4) 24

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 IInd Sitting)

64. 729 ml of a mixture contains milk and water in the ratio 7 : 2. How much more water is to be added to get a new mixture containing milk and water in the ratio 7 : 3 ?

(1) 81 ml (2) 60 ml
(3) 71 ml (4) 52 ml

(SSC CGL Tier-I Exam, 09.08.2015 (Ist Sitting) TF No. 1443088)

65. 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 :

(1) 10 : 21 (2) 13 : 22
(3) 14 : 25 (4) 12 : 23

(SSC CGL Tier-I Exam, 16.08.2015 (IInd Sitting) TF No. 2176783)

66. Three utensils contain equal quantity of mixtures of milk and water in the ratio 6 : 1, 5 : 2 and 3 : 1 respectively. If all the solutions are mixed together, the ratio of milk and water in the final mixture is
(1) 65 : 28 (2) 65 : 19
(3) 19 : 65 (4) 19 : 28
(SSC CGL Tier-I Re-Exam, 30.08.2015)

67. 60 kg of an alloy A is mixed with 100 kg of alloy B. If alloy A has lead and tin in the ratio 3 : 2 and alloy B has tin and copper in the ratio 1 : 4, the amount of tin in the new alloy is
(1) 53 kg (2) 44 kg
(3) 80 kg (4) 24 kg
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

68. Three glasses of equal volume contains acid mixed with water. The ratios of acid and water are 2 : 3, 3 : 4 and 4 : 5 respectively. Contents of these glasses are poured in a large vessel. The ratio of acid and water in the large vessel is
(1) 411 : 540 (2) 401 : 544
(3) 417 : 564 (4) 407 : 560
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

69. Two blends of a commodity costing Rs. 35 and Rs. 40 per kg. respectively are mixed in the ratio 2 : 3 by weight. If one–fifth of the mixture is sold at Rs. 46 per kg and the remaining at the rate of Rs. 55 per kg. the profit percent is
(1) 50 (2) 30
(3) 40 (4) 20
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

70. 20 litres of a mixture contains milk and water in the ratio 3 : 1. Then the amount of milk to be added to the mixture so as to have milk and water in ratio 4 : 1 is :
(1) 7 litres (2) 4 litres
(3) 5 litres (4) 6 litres
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (Ist Sitting) TF No. 6636838)

71. 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 :
(1) 25 litres (2) 32.5 litres
(3) 16 litres (4) 22.75 litres
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (Ist Sitting) TF No. 1375232)

72. A vessel contains 60 litres of milk. 12 litres of milk is taken out from it and replaced by water. Then again from mixture, 12 litres is again taken out and replaced by water. The ratio of milk and water in the resultant mixture is :
(1) 15:10 (2) 16:9
(3) 9:5 (4) 16:10
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

73. A mixture contains spirit and water in the ratio of 3 : 2. If it contains 3 litres more spirit than water, the quantity of spirit in the mixture is
(1) 12 litres (2) 10 litres
(3) 9 litres (4) 8 litres
(SSC CGL Tier-I (CBE) Exam.11.09.2016) (Ist Sitting)

74. 49 kg of blended tea contains Assam and Darjeeling tea in the ratio 5 : 2. Then the quantity of Darjeeling tea to be added to the mixture to make the ratio of Assam to Darjeeling tea 2 : 1 is
(1) 4.5 kg (2) 3.5 kg
(3) 5 kg (4) 6 kg
(SSC CGL Tier-II Online Exam.01.12.2016)

75. Three containers have their volumes in the ratio 3 : 4 : 5. They are full of mixtures of milk and water. The mixtures contain milk and water in the ratio of (4 :1), (3 : 1) and (5 : 2) respectively. The contents of all these three containers are poured into a fourth container. The ratio of milk and water in the fourth container is
(1) 4 : 1 (2) 151 : 48
(3) 157 : 53 (4) 5 : 2
(SSC CGL Tier-II Online Exam.01.12.2016)

76. In what proportion must a grocer mix sugar at Rs.12 a kg and Rs.7 a kg so as to make a mixture worth Rs. 8 a kg.?
(1) 7 : 12 (2) 1 : 4
(3) 2 : 3 (4) 12 : 7
(SSC CGL Tier-II Online Exam.01.12.2016)

77. A canister holds 36 litres of mixture of milk and water in the ratio 3 : 1. 15 litres of milk is added to the canister. The new ratio of the mixture is :
(1) 12 : 5 (2) 14 : 3
(3) 7 : 4 (4) 9 : 4
(SSC CPO Exam. 06.06.2016) (Ist Sitting)

78. In a mixture of 25 litres, the ratio of milk to water is 4 : 1. Another 3 litres of water is added to the mixture. The ratio of milk to water in the new mixture is
(1) 5 : 1 (2) 5 : 2
(3) 5 : 3 (4) 5 : 4
(SSC CGL Tier-I (CBE) Exam. 09.09.2016) (Ist Sitting)

79. Three containers whose volumes are in the ratio of 2 : 3 : 4 are full of mixture of spirit and water. In the 1st container, the ratio of spirit and water is 4 : 1, in the 2nd container the ratio is 11 : 4 and in the 3rd container ratio is 7 : 3. All the three mixtures are mixed in a big container. The ratio of spirit and water in the resultant mixture is :
(1) 4 : 9 (2) 11 : 4
(3) 5 : 10 (4) 9 : 5
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 20.03.2016) (IInd Sitting)

80. Two bottles contain acid and water in the ratio 2 : 3 and 1 : 2 respectively. These are mixed in the ratio 1 : 3. What is the ratio of acid and water in the new mixture ?
(1) 7:13 (2) 11:57
(3) 23:37 (4) 1:3
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

81. In two types of brass, the ratios of Copper to Zinc are 8:3 and 15:7 respectively. If the two types of brass be melted and mixed in the ratio 5:2 a new type of brass is obtained. The ratio of Copper to Zinc in this new type of brass is
(1) 3:2 (2) 2:3
(3) 3:4 (4) 5:2
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

82. There are three bottles of mixture of syrup and water of ratios 2 : 3, 3 : 4 and 7 : 5. 10 litres of the first and 21 litres of the second bottles are taken. How much quantity from third bottle is to be taken so that final mixture from three bottles will be of ratios 1 : 1.
(1) 25 litres (2) 20 litres
(3) 35 litres (4) 30 litres
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

TYPE–IX

1. The income of A, B and C are in the ratio 3 : 7 : 4 and their expenses in the ratio 4 : 3 : 5. If A saves ₹ 300 out of an income of ₹ 2,400, the savings of B and C are :
(1) ₹ 4025 and ₹ 575
(2) ₹ 1575 and ₹ 2.625
(3) ₹ 2750 and ₹ 1.525
(4) ₹ 3725 and ₹ 1.525
(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

2. Between two consecutive years my income are in the ratio of 2 : 3 and expenses in the ratio 5 : 9. If my income in the second year is ₹ 45000 and my expenses in the first year is ₹ 25000 my total savings for the two years is :
(1) Nil (2) ₹ 15000
(3) ₹ 10000 (4) ₹ 5000
(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

3. A and B have monthly incomes in the ratio 5 : 6 and monthly expenditures in the ratio 3 : 4. If they save ₹ 1800 and ₹ 1600 respectively, find the monthly income of B :
(1) ₹ 3400 (2) ₹ 2700
(3) ₹ 1720 (4) ₹ 7200
(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

4. 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 ₹ 900 respectively.
(1) ₹ 4,000, ₹ 2,400
(2) ₹ 3,000, ₹ 1,800
(3) ₹ 5,000, ₹ 3,000
(4) ₹ 4,500 ₹ 2,700
(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

5. 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 ₹ 600 in the year, the annual income of A is
(1) ₹ 4800 (2) ₹ 1800
(3) ₹ 1200 (4) ₹ 2400
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & SSC CPO SI 03.09.2006, 26.05.2005 & SSC MT (Non- Technical) Exam. 27.02.2011)

6. The income of A, B and C are in the ratio 7 : 9 : 12 and their spendings are in the ratio 8 : 9 : 15. If A saves $\frac{1}{4}$th of his income, then the savings of A, B and C are in the ratio of :
(1) 56 : 99 : 69 (2) 69 : 56 : 99
(3) 99 : 56 : 69 (4) 99 : 69 : 56
(SSC CGL Prelim Exam. 11.05.2003 (Ist Sitting) & SSC CGL Tier-I Exam. 26.06.2011(IInd sitting)

7. 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
(1) ₹ 20000 (2) ₹ 12000
(3) ₹ 18000 (4) ₹ 24000
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

8. 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 ₹ 7250, what is the amount of his monthly savings ?
(1) ₹ 350 (2) ₹ 290
(3) ₹ 750 (4) ₹ 780
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

9. The monthly salaries of A, B and C are in the ratio 2 : 3 : 5. If C's monthly salary is ₹ 12,000 more than that of A, then B's annual salary is
(1) ₹ 1,20,000 (2) ₹ 1,44,000
(3) ₹ 1,80,000 (4) ₹ 2,40,000
(SSC CHSL DEO & LDC Exam. 28.11.2010 (IInd Sitting)

10. The ratio of income of two persons is 5 : 3 and that of their expenditures is 9 : 5. If they save ₹ 2600 and ₹1800 respectively, their incomes are :
(1) ₹ 8000; ₹ 4800
(2) ₹ 6000; ₹ 3600
(3) ₹ 10000; ₹ 6000
(4) ₹ 9000; ₹ 5400
(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

11. 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 ₹ 600 per month, then their monthly incomes are
(1) ₹ 1,500; ₹ 2,250
(2) ₹ 1,200; ₹ 1,800
(3) ₹ 1,600; ₹ 2,400
(4) ₹ 1,400; ₹ 2,100
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

12. A person bought some rice and wheat for ₹ 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
(1) ₹ 380 (2) ₹ 300
(3) ₹ 200 (4) ₹ 180
(SSC Multi-Tasking Staff Exam. 17.03.2013, Ist Sitting)

13. The ratio of incomes of A and B is 5 : 6. If A gets ₹ 1,100 less than B, their total income (in rupees) is
(1) 9,900 (2) 12,100
(3) 14,400 (4) 10,000
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

14. The income of A and B are in the ratio 5 : 3. The expenses of A, B and C are in the ratio 8 : 5 : 2. If C spends ₹ 2000 and B saves ₹ 700, then A saves
(1) ₹ 1500 (2) ₹ 1000
(3) ₹ 500 (4) ₹ 250
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

15. The ratio of income and expenditure of a person is 11 : 10. If he saves ₹ 9,000 per annum, his monthly income is
(1) ₹ 8,000 (2) ₹ 8,800
(3) ₹ 8,500 (4) ₹ 8,250
(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

16. 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
(1) ₹ 4, 500 (2) ₹ 10, 000
(3) ₹ 4, 000 (4) ₹ 5, 000
(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

17. Monthly income of A and B are in the ratio of 4 : 3 and their expenses bear the ratio 3 : 2. Each of them saves ₹ 6,000 at the end of the month, then the monthly income of A is
(1) ₹ 12,000 (2) ₹ 24,000
(3) ₹ 30,000 (4) ₹ 60,000
(SSC CGL Tier-1 Exam. 19.06.2011 (Second Sitting)

18. The ratio of weekly income of A and B is 9 : 7 and the ratio of their expenditures is 4 : 3. If each saves ₹ 200 per week, then the sum of their weekly income is
(1) ₹ 3,600 (2) ₹ 3,200
(3) ₹ 4,800 (4) ₹ 5,600
(SSC CGL Tier-1 Exam. 26.06.2011 (First Sitting)

19. The ratio of the incomes 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 ₹1000, what is B's income in ₹ ?
(1) 3000 (2) 2500
(3) 3500 (4) 4000
(SSC CHSL DEO & LDC Exam. 28.10.2012, Ist Sitting)

20. The income of A and B are in the ratio 2 : 3 and their expenditures are in the ratio 1 : 2. If each saves ₹24,000, find A's income.
(1) ₹ 24,000 (2) ₹ 72,000
(3) ₹ 19,200 (4) ₹ 48,000
(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011 (Paper-I)

21. Incomes of A and B are in the ratio 4 : 3 and their annual expenses in the ratio 3 : 2. If each saves ₹ 60,000 at the end of the year, the annual income of A is
(1) ₹ 1,20,000 (2) ₹ 1,50,000
(3) ₹ 2,40,000 (4) ₹ 3,60,000
(SSC Data Entry Operator Exam. 02.08.2009)

22. Ratio between the monthly incomes of A and B is 9 : 8 and the ratio between their expenditures is 8 : 7. If they save ₹ 500 each, find A's monthly income.
(1) ₹ 3,500 (2) ₹ 4,000
(3) ₹ 4,500 (4) ₹ 5,000
(SSC Multi-Tasking (Non-Technical) Staff Exam. 20.02.2011)

23. 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₹ 8,00,000, then the monthly salary of B (in ₹) is
(1) 20,000 (2) 25,000
(3) 30,000 (4) 15,000
(SSC Constable (GD) & Rifleman (GD) Exam. 22.04.2012 (IInd Sitting)

24. Annual incomes of Amit and Veeri are in the ratio 3:2, while the ratio of their expenditure is 5 : 3. If at the end of the year each saves ₹ 1,000, the annual income of Amit is
(1) ₹ 9,000 (2) ₹ 8,000
(3) ₹ 7,000 (4) ₹ 6,000
(SSC Graduate Level Tier-II Exam.16.09.2012)

25. The ratio of monthly incomes of A, B is 6 : 5 and their monthly expenditures are in the ratio 4 : 3. If each of them saves ₹ 400 per month, find the sum of their monthly incomes.
(1) 2300 (2) 2400
(3) 2200 (4) 2500
(SSC Graduate Level Tier-I Exam. 21.04.2013)

26. 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
(1) ₹ 8000 (2) ₹ 6000
(3) ₹ 2000 (4) ₹ 4000
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

27. The incomes of A and B are in the ratio 3 : 2 and their expenditures are in the ratio 5 : 3. If each saves Rs. 1000, then A's income is
(1) Rs. 6000 (2) Rs. 4000
(3) Rs. 2000 (4) Rs. 5000
(SSC CGL Tier-I Re-Exam, 30.08.2015)

28. 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 incomes is
(1) Rs. 52,000(2) Rs. 42,000
(3) Rs. 44,000(4) Rs. 46,000
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

29. A man spends a part of his monthly income and saves the rest. The ratio of his expenditure to the savings is 61 : 6. If his monthly income is Rs. 8710, the amount of his monthly savings is
(1) Rs. 870 (2) Rs. 690
(3) Rs. 980 (4) Rs. 780
(SSC CGL Tier-I (CBE) Exam. 28.08.2016) (IInd Sitting)

30. A's income is Rs. 140 more than B's income and C's income is Rs. 80 more than D's. If the ratio of A's and C's incomes is 2 : 3 and the ratio of B's and D's incomes is 1 : 2, then the incomes of A, B, C and D are respectively
(1) Rs. 260, Rs. 120, Rs. 320 and Rs. 240
(2) Rs. 300, Rs. 160, Rs. 600 and Rs. 520
(3) Rs. 400, Rs. 260, Rs. 600 and Rs. 520
(4) Rs. 320, Rs. 180, Rs. 480 and Rs. 360
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

TYPE–X

1. ₹ 180 contained in a box consists of one rupee, 50 paise and 25 paise coins in the ratio 2 : 3 : 4. What is the number of 50 paise coins?
(1) 60 (2) 120
(3) 150 (4) 180
(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

2. If 378 coins consist of rupees, 50 paise and 25 paise coins, whose values are in the ratio of 13 : 11 : 7, the number of 50 paise coins will be :
(1) 132 (2) 128
(3) 136 (4) 133
(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

3. A bag contains ₹ 90 in coins of denominations 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
(1) 80 (2) 120
(3) 100 (4) 135
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

4. 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 :
(1) 80 (2) 112
(3) 160 (4) 172
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

5. 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 ₹ 112.50, the number of 50-paise coins is
(1) 80 (2) 50
(3) 30 (4) 42
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

6. 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 ₹ 372. The total number of coins is
(1) 1200 (2) 961
(3) 744 (4) 612
(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

7. 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
(1) 65 (2) 66
(3) 77 (4) 78
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

8. A boy has a few coins of denominations 50 paise, 25 paise and 10 paise in the ratio 1 : 2 : 3. If the total amount of the coins is ₹ 6.50, the number of 10 paise coins is
(1) 5 (2) 10
(3) 15 (4) 20
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

9. A man has in all ₹ 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 ?
(1) 150 (2) 120
(3) 100 (4) 90
(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (Second Sitting)

10. A bag contains three types of coins-rupee-coins. 50p-coins and 25 p-coins totalling 175 coins. If the total value of the coins of each kind be the same, the total amount in the bag is
(1) ₹ 75 (2) ₹ 175
(3) ₹ 300 (4) ₹ 126
(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (Second Sitting)

11. There are 480 coins in 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
(1) 100, 200, 180
(2) 50, 30, 400
(3) 150, 180, 150
(4) 300, 90, 90
(SSC Multi-Tasking Staff Exam. 17.03.2013, Ist Sitting)

12. A box contains 420 coins in rupee, 50 paise and 20 paise coins. The ratio of their rupee values being 13 : 11 : 7. The number of 50 paise coins is
(1) 42 (2) 78
(3) 66 (4) 132
(SSC Multi-Tasking Staff Exam. 24.03.2013, Ist Sitting)

13. A box contains ₹ 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?
(1) 52 (2) 64
(3) 32 (4) 16
(SSC FCI Assistant Grade-III Main Exam. 07.04.2013)

14. 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
(1) 20 : 66 : 95 (2) 21 : 66 : 95
(3) 21 : 66 : 92 (4) 19 : 66 : 92
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

15. Three persons A, B, C whose salaries together amount to ₹ 72000 spend 80, 85 and 75 percent of their salaries respectively. If their savings are in the ratio 8 : 9 : 20, then A's salary is
(1) ₹ 20,000 (2) ₹ 16,000
(3) ₹ 22,000 (4) ₹ 18,000
(SSC CHSL DEO & LDC Exam. 04.12.2011 (Ist Sitting (East Zone)

16. A box contains 280 coins of one-rupee, 50-paise and 25-paise. The values of each kind of the coins are in the ratio of 8 : 4 : 3. Then the number of 50-paise coins is
(1) 70 (2) 60
(3) 80 (4) 90
(SSC CHSL DEO Exam. 16.11.2014 (Ist Sitting)

TYPE–XI

1. By mistake, instead of dividing ₹ 117 among A, B and 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 by how much?
(1) A, ₹ 28 (2) B, ₹ 3
(3) C, ₹ 20 (4) C, ₹ 25
(SSC CGL Prelim Exam. 04.07.1999 (First Sitting)

2. If a sum of money is to be divided among A, B, C such that A's share is equal to twice B's share and B's share is 4 times C's share, then their shares are in the ratio:
(1) 1 : 2 : 4 (2) 1 : 4 : 1
(3) 8 : 4 : 1 (4) 2 : 4 : 1
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

3. Divide ₹ 7,500 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?
(1) ₹ 1,400 (2) ₹ 3,500
(3) ₹ 2,600 (4) ₹ 7,000
(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

4. A sum of ₹ 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 repectively. Find the share of C.
(1) ₹ 480 (2) ₹ 360
(3) ₹ 400 (4) ₹ 630
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

5. ₹ 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
(1) ₹ 2040 (2) ₹ 1680
(3) ₹ 2000 (4) ₹ 1720
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

6. ₹ 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 ?
(1) ₹ 350 (2) ₹ 260
(3) ₹ 140 (4) ₹ 250
(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

7. ₹ 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 :
(1) ₹ 6000 (2) ₹ 14440
(3) ₹ 9200 (4) ₹ 16000
(SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

8. ₹ 6,400 are divided among three workers in the ratio $\frac{3}{5} : 2 : \frac{5}{3}$. The share (in rupees) of the second worker is
(1) 3,200 (2) 3,840
(3) 2,560 (4) 3,000
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

9. Divide ₹ 1250 among A, B, C, so that A gets $\frac{2}{9}$ of B's share and C gets $\frac{3}{4}$ of A's share.
(1) ₹ 200, ₹ 800, ₹ 250
(2) ₹ 200, ₹ 900, ₹ 150
(3) ₹ 150, ₹ 800, ₹ 300
(4) ₹ 200, ₹ 900, ₹ 75
(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

10. A sum of ₹ 9000 is to be distributed among A, B and C in the ratio 4 : 5 : 6. What will be the difference between A's and C's shares?
(1) ₹ 600 (2) ₹ 1000
(3) ₹ 900 (4) ₹ 1200
(SSC CGL Prelim Exam. 24.02.2002 (First Sitting)

11. A sum of ₹ 370 is to be divided among A, B and C such that $\frac{\text{A's Share}}{\text{B's Share}} = \frac{\text{B's Share}}{\text{C's Share}} = \frac{3}{4}$, A's share (in rupees) is
(1) 240 (2) 120
(3) 100 (4) 90
(SSC Section Officer (Commercial Audit) Exam. 16.11.2003)

12. 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 ?
(1) ₹ 5000 (2) ₹ 7500
(3) ₹ 9000
(4) Information inadequate
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

13. ₹ 2010 are to be divided among A, B and C in such a way that if A gets ₹ 5 then B must get Rs. 12 and if B gets ₹ 4 then C must get ₹ 5.50. The share of C will exceed that of B by
(1) ₹ 620 (2) ₹ 430
(3) ₹ 360 (4) ₹ 270
(SSC CPO S.I. Exam. 16.12.2007)

14. ₹ 600 are divided among A, B and C so that ₹ 40 more than $\frac{2}{5}$ of A's share, ₹ 20 more than $\frac{2}{7}$ of B's share and ₹ 10 more than $\frac{9}{17}$ of C's share are all equal. A's share is
(1) ₹ 180 (2) ₹ 160
(3) ₹ 150 (4) ₹ 140
(SSC SAS Exam. 26.06.2010 (Paper-1)

15. A sum of ₹ 86, 700 is to be divided among A, B and C in such a manner that for every rupee that A gets, B gets 90 paise and for every rupee that B gets, C gets 100 paise. B's share will be
(1) ₹ 26, 010 (2) ₹ 27,000
(3) ₹ 28,000 (4) ₹ 28, 090
(SSC Data Entry Operator Exam. 31.08.2008)

16. A sum of ₹ 7,000 is divided among A, B, C in such a way that the shares of A and B are in the ratio 2 : 3 and those of B and C are in the ratio 4 : 5. The share of B is
(1) ₹ 2,400 (2) ₹ 3,000
(3) ₹ 1,600 (4) ₹ 2,000
(SSC CHSL DEO & LDC Exam. 21.10.2012 (Ist Sitting)

17. ₹ 180 are to be divided among 66 persons (men and women). The ratio of the total amount of money received by men and women is 5 : 4. But the ratio of the money received by each man and woman is 3 : 2. The number of men is
(1) 20 (2) 24
(3) 30 (4) 36

18. ₹ 738 is divided among A, B, C so that their shares are in the ratio of 2 : 3 : 4. B's share is
(1) ₹ 328 (2) ₹ 246
(3) ₹ 264 (4) ₹ 164
(SSC Multi-Tasking Staff Exam. 10.03.2013, Ist Sitting : Patna)

19. ₹ 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
(1) ₹ 580 (2) ₹ 696
(3) ₹ 348 (4) ₹ 464
(SSC Multi-Tasking Staff Exam. 17.03.2013, Ist Sitting)

20. A certain amount of money is divided among x, y and z. If x receives 25% more than y and y receives 25% less than z, then $x : y : z$ is equal to
(1) 14 : 12 : 13
(2) 15 : 12 : 16
(3) 10 : 9 : 12
(4) 12 : 10 : 11
(SSC Multi-Tasking Staff Exam. 17.03.2013, IInd Sitting)

21. A sum of ₹ 53 is divided among A, B and C in such a way that A gets ₹ 7 more than what B gets and B gets ₹ 8 more than what C gets. The ratio of their share is
(1) 16 : 9 : 18 (2) 25 : 18 : 10
(3) 18 : 25 : 10 (4) 15 : 8 : 30
(SSC Multi-Tasking Staff Exam. 17.03.2013, Kolkata Region)

22. ₹ 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.
(1) 150, 250, 300
(2) 160, 240, 300
(3) 150, 250, 290
(4) 150, 240, 310
(SSC Graduate Level Tier-I Exam. 21.04.2013)

23. Divide ₹ 2,600 among A, B,C in the ratio $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$. Find the share of each.
(1) ₹ 1,200,₹ 600,₹ 800
(2) ₹ 1,200,₹ 800,₹ 600
(3) ₹ 600,₹ 800,₹ 1,200
(4) ₹ 800,₹ 600,₹ 1,200
(SSC Graduate Level Tier-I Exam. 19.05.2013 Ist Sitting)

24. 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
(1) 5 : 3 : 2 (2) 2 : 3 : 5
(3) 3 : 2 : 5 (4) 2 : 5 : 3
(SSC Graduate Level Tier-I Exam. 19.05.2013 Ist Sitting)

25. ₹ 900 is divided among A, B, C; the division is such that $\frac{1}{2}$ of A's money = $\frac{1}{3}$ of B's money = $\frac{1}{4}$ of C's money. Find the amount (in ₹) received by A, B, C.
(1) 300, 400, 200
(2) 350, 450, 100
(3) 200, 300, 400
(4) 400, 150, 350
(SSC Graduate Level Tier-II Exam. 29.09.2013)

26. If ₹ 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
(1) ₹ 36.50 (2) ₹ 35.50
(3) ₹ 34.50 (4) ₹ 33.50
(SSC Graduate Level Tier-II Exam. 29.09.2013)

27. A sum of ₹ 76 is divided among A, B and C in such a way that A gets ₹ 7 more than that what B gets and B gets ₹ 6 more than what C gets. The ratio of their shares is
(1) 19 : 24 : 33 (2) 32 : 25 : 19
(3) 32 : 24 : 20 (4) 19 : 25 : 33
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

28. ₹ 3,000 is divided between A, B and C, so that A receives $\frac{1}{3}$ as much as B and C together receive and B receives $\frac{2}{3}$ as much as A and C together receive. Then the share of C is
(1) ₹ 600 (2) ₹ 525
(3) ₹ 1,625 (4) ₹ 1,050
(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (IInd Sitting)

29. ₹ 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 of 4 : 5 : 6. The amount in excess received by C was
(1) ₹ 72 (2) ₹ 75
(3) ₹ 22 (4) ₹ 52
(SSC CGL Tier-I Exam. 26.10.2014)

30. 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 ₹ 10,000 less than son, the value (in rupees) of the whole property is
(1) ₹ 16,250 (2) ₹ 16,000
(3) ₹ 18,250 (4) ₹ 17,000
(SSC CGL Tier-II Exam. 21.09.2014)

31. A sum of ₹ 730 was divided among A, B and C in such a way that if A gets ₹ 3, then B gets ₹ 4 and if B gets ₹ 3.50 then C gets ₹ 3. The share of B exceeds that of C by
(1) ₹ 30 (2) ₹ 40
(3) ₹ 70 (4) ₹ 210
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014 TF No. 999 KP0)

32. A sum of money is divided among A, B, C and D in the proportion of 7 : 6 : 3 : 5. If B gets ₹ 270 more than C, then share of D is
(1) ₹ 250 (2) ₹ 350
(3) ₹ 450 (4) ₹ 455
(SSC CHSL (10+2) DEO & LDC Exam. 16.11.2014, IInd Sitting TF No. 545 QP 6)

33. In a partnership business, B's capital was half of A's. If after 8 months, B withdrew half of his capital and after 2 months more A withdrew $\frac{1}{4}$ th of his capital, then the profit ratio of A and B will be
(1) 5 : 2 (2) 10 : 23
(3) 2 : 5 (4) 23 : 10
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

34. A and B invest in the ratio 3 : 5. After 6 months, C joins the business investing an amount equal to B's. At the end of the year what will be the ratio of their profits ?
(1) 6 : 10 : 5 (2) 3 : 5 : 2
(3) 8 : 10 : 5 (4) 3 : 5 : 5
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

35. A and B entered into a partnership investing Rs 16000 and Rs. 12000 respectively. After 3 months A withdrew Rs. 5000 while B invested Rs. 5000 more. After 3 more months C joins the business with a capital of Rs 21000. The share of B exceeds that of C, out of a total profit of Rs. 26400 after one year by
(1) Rs. 2400 (2) Rs. 1200
(3) Rs. 3600 (4) Rs. 4800
(SSC CGL Tier-I Exam, 09.08.2015 (IInd Sitting) TF No. 4239378)

36. In a business A and C invested amounts in the ratio 2 : 1, whereas A and B invested amounts in the ratio 3 : 2. If their annual profit be Rs. 157300, then B's share in the profit is
(1) Rs. 24200 (2) Rs. 48000
(3) Rs. 36300 (4) Rs. 48400
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 01.11.2015, IInd Sitting)

37. An amount of Rs. 380 is to be divided among 5 men, 8 boys and 4 women such that the ratio of amount received by the three is in the ratio of 8: 4: 7. What is the share of a woman?
(1) Rs. 35 (2) Rs. 36.5
(3) Rs. 40 (4) Rs. 32.8
(SSC CPO SI, ASI Online Exam.05.06.2016) (IInd Sitting)

38. A certain sum of money was divided between A, B and C in the ratio 5 : 6 : 9. If A received Rs. 450, the sum divided was
(1) Rs. 2000 (2) Rs. 1800
(3) Rs. 2250 (4) Rs. 1000
(SSC CGL Tier-I (CBE) Exam. 09.09.2016) (Ist Sitting)

39. Rs. 490 is divided among A, B and C such that A's share is half that of B's and thrice that of C's. What is C's share ?
(1) Rs. 49 (2) Rs. 147
(3) Rs. 294 (4) Rs. 245
(SSC CGL Tier-I (CBE) Exam. 27.08.2016) (Ist Sitting)

40. A profit of Rs. 960 is divided between A and B in the ratio $\frac{1}{3}:\frac{1}{2}$. The difference of their profits is :
(1) Rs. 120 (2) Rs. 160
(3) Rs. 180 (4) Rs. 240
(SSC CGL Tier-I (CBE) Exam. 29.08.2016) (IInd Sitting)

41. Three brothers divided Rs. 1620 among themselves in such a way that the share of second is equal to $\frac{5}{13}$ of the share of other two, combined. What is the share of the second one?
(1) Rs. 1170 (2) Rs. 450
(3) Rs. 540 (4) Rs. 500
(SSC CGL Tier-I (CBE) Exam. 31.08.2016) (IInd Sitting)

42. If a certain amount is fully distributed among A, B and C in such a way that A receives $\frac{1}{2}$ of the amount, B receives $\frac{1}{3}$ of the amount and C receives Rs. 1200, then how much money would A receive ?
(1) Rs. 4000 (2) Rs. 1600
(3) Rs. 3600 (4) Rs. 1800
(SSC CGL Tier-I (CBE) Exam. 01.09.2016) (IInd Sitting)

43. A, B and C together start a business. Three times the investment of A equals four times the investment of B and the capital of B is twice that of C. The ratio of share of each in the profit is
(1) 8 : 3 : 6 (2) 3 : 8 : 6
(3) 3 : 6 : 8 (4) 8 : 6 : 3
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

44. A sum of Rs. 770 has been divided among A, B and C in such a way that A receives $\frac{2}{9}$th of what B and C together receive. Then A's share is
(1) Rs. 140 (2) Rs. 154
(3) Rs. 165 (4) Rs. 170
(SSC CGL Tier-I (CBE) Exam. 28.08.2016 (IST Sitting)

45. A sum of Rs. 730 was divided among A, B and C in such a way that if A gets Rs. 3 then B gets Rs. 4 and if B gets Rs. 3.50 then C gets Rs. 3. The share of B exceeds that of C by
(1) Rs. 30 (2) Rs. 40
(3) Rs. 70 (4) Rs. 210
(SSC CGL Tier-I (CBE) Exam. 09.09.2016 (IIIrd Sitting)

46. A and B start an enterprise together, with A as active partner. A invests Rs. 4000 and Rs. 2000 more after 8 months. B invests Rs. 5000 and withdraws Rs. 2000 after 9 months. Being the active partner, A takes Rs. 100 per month as allowance, from the profit. What is the share of B if the profit for the year is Rs. 6700?
(1) Rs. 3350 (2) Rs. 3250
(3) Rs. 2700 (4) Rs. 2800
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

47. A sum of Rs. 15525 is divided among Sunil, Anil and Jamil such that if Rs. 22, Rs. 35 and Rs. 48 be diminished from their shares respectively, their remaining sums shall be in the ratio 7 : 10 : 13. What would have been the ratio of their sums if Rs. 16, Rs. 77 and Rs. 37 respectively were added to their original shares?
(1) 9 :13 : 17 (2) 18 : 26 : 35
(3) 36 : 52 : 67 (4) None of these
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

48. ₹ 1980 is divided among A, B and C so that half of A's part, one-third of B's part and one-sixth of C's part are equal. Then B's part is
(1) ₹ 540 (2) ₹ 660
(3) ₹ 1,080 (4) ₹ 360
(SSC Multi-Tasking Staff Exam. 30.04.2017)

49. A, B and C invested ₹ 13,000, ₹ 17,000 and ₹ 5,000 respectively in a business. At the end of the year, they earn a profit of ₹ 1,400. B's share of profit is
(1) ₹ 680 (2) ₹ 410
(3) ₹ 630 (4) ₹ 720
(SSC Multi-Tasking Staff Exam. 30.04.2017)

50. ₹ 600 is divided among A, B and C. ₹ 40 more than $\frac{2}{5}$th of A' share, ₹ 20 more than $\frac{2}{7}$th of B's share and ₹ 10 more than $\frac{9}{17}$th of C's share are all equal. Then A's share is
(1) ₹ 150 (2) ₹ 170
(3) ₹ 280 (4) ₹ 140
(SSC Multi-Tasking Staff Exam. 30.04.2017)

TYPE–XII

1. How many sides does a regular polygon have whose interior and exterior angles are in the ratio 2 : 1?
(1) 3 (2) 5
(3) 6 (4) 12
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

2. The smallest integer, which subtracted from both the terms of 6 : 7 gives a ratio less than 16 : 21, is :
(1) 5 (2) 4
(3) 3 (4) 2
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

3. 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
(1) $25\frac{1}{2}$ (2) $67\frac{1}{2}$
(3) $76\frac{1}{2}$ (4) $86\frac{1}{2}$
(SSC CPO S.I. Exam. 12.01.2003

4. Tea worth ₹126 per kg and ₹135 per kg are mixed with a third variety in the ratio 1 : 1 : 2. If the mixture is worth ₹153 per kg, the price of the third variety per kg will be
(1) ₹175.5 (2) ₹ 180.0
(3) ₹169.5 (4) ₹170.0
(SSC CHSL DEO & LDC Exam. 21.10.2012 (Ist Sitting)

5. Same quantity of rice is required for each member of a family of 15 members. On a particular day, due to the absence of some members of the family, the consumption of rice was reduced in the ratio 5 : 3. The number of members absent on that day was
(1) 3 (2) 6
(3) 8 (4) 9
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

6. Instead of dividing ₹ 117 among *P*, *Q*, *R* in the ratio $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$, by mistake it was divided in the ratio 2 : 3: 4. Who gained in the transaction ?
(1) Only *P* (2) Only *Q*
(3) Only *R* (4) Both *Q* and *R*
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

7. 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, ₹ 1, 325 are collected from passengers travelling between the two stations, then the amount collected from the second class passengers is
(1) ₹ 1,250 (2) ₹ 1,000
(3) ₹ 850 (4) ₹ 750
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

8. 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
(1) 171 (2) 181
(3) 185 (4) 161
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

9. 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. The total number who appeared at the examination is
(1) 145 (2) 150
(3) 155 (4) 180
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

10. In a cricket match the total number of runs scored by Sachin, Vinod and Sourav is 285. The ratio of the number of runs scored by Sachin and Sourav is 3 : 2 and that of the runs scored by Sourav and Vinod is also 3 : 2. The number of runs scored by Sachin in that match is

(1) 135 (2) 90
(3) 60 (4) 140

(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

11. The 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

(1) 7 : 8 (2) 8 : 7
(3) 9 : 8 (4) 9 : 7

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

12. 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

(1) 2 kg (2) 4 kg
(3) 3 kg (4) 5 kg

(SSC CPO S.I. Exam. 06.09.2009)

13. 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

(1) 700 (2) 720
(3) 900 (4) 960

(SSC SAS Exam. 26.06.2010 (Paper-1)

14. The price of a refrigerator and a television set are in the ratio 5 : 3. If the refrigerator costs ₹ 5500 more than the television set, then the price of the refrigerator is:

(1) ₹ 27500 (2) ₹ 8250
(3) ₹ 13750 (4) ₹ 16500

(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

15. A man leaves ₹ 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?

(1) ₹ 100 (2) ₹ 600
(3) ₹ 800 (4) ₹ 1,000

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

16. A and B together have ₹ 158. C has ₹ 101 less than what A and B together have, and B has ₹ 23 more than C. The amount of A is :

(1) ₹ 80 (2) ₹ 78
(3) ₹ 57 (4) ₹ 88

(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

17. A sum of ₹ 340.68 is distributed among L, M and N such that L gets ₹ 5.72 more than N and M gets Rs. 2.24 more than L. N gets

(1) ₹ 109 (2) ₹ 110.90
(3) ₹ 113.56 (4) ₹ 114.72

(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

18. 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 ₹ 1,100 are collected as total fare, the amount collected from the first class passengers is

(1) ₹ 315 (2) ₹ 275
(3) ₹ 137.50 (4) ₹ 100

(SSC Data Entry Operator Exam. 02.08.2009)

19. 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 :

(1) 10 : 15 : 13 (2) 2 : 3 : 4
(3) 15 : 20 : 12 (4)16 : 18 : 15

(SSC CHSL DEO & LDC Exam. 28.11.2010 (Ist Sitting)

20. From each of the two given unequal numbers, half the smaller number is subtracted. Then, of the resulting numbers, the larger one is five times than the smaller one. Then the ratio of the larger to smaller one is

(1) 2 : 1 (2) 3 : 2
(3) 3 : 1 (4) 1 : 4

(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (Delhi Zone)

21. A person ordered 4 shirts of brand *A* and some shirts of brand *B*. The price of one shirt of brand *A* was twice that of brand *B*. When the order was executed, it was found that the numbers of the two brands has been interchanged. This increased the bill by 40%. The ratio of the number of brand *A* shirts to that of brand *B* shirts in the original order was

(1) 1 : 2 (2) 1 : 3
(3) 1 : 4 (4) 1 : 5

(SSC CHSL DEO & LDC Exam. 11.12.2011 (Ist Sitting (Delhi Zone)

22. 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

(1) 140 (2) 120
(3) 200 (4) 160

(SSC Constable (GD) & Rifleman (GD) Exam. 22.04.2012 (IInd Sitting)

23. A box filled with paper bundles weighs 36 kg. If the weight of the box and paper bundles respectively are in the ratio of 3 : 22, then the weight of the papers (in grams) is

(1) 30680 grams (2) 30710 grams
(3) 31500 grams (4) 31680 grams

(SSC Assistant Grade-III Exam. 11.11.2012 (IInd Sitting)

24. 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

(1) 12, 16 (2) 6, 8
(3) 9, 12 (4) 12, 9

(SSC Assistant Grade-III Exam. 11.11.2012 (IInd Sitting)

25. In a school, 10% of number of girls is equal to $\frac{1}{20}$ th of number of boys. Ratio between the number of boys to number of girls is

(1) 1 : 2 (2) 2 : 1
(3) 1 : 4 (4) 4 : 1

(SSC Graduate Level Tier-I Exam. 19.05.2013)

26. A policeman starts to chase a thief. When the thief goes 10 steps the policeman moves 8 steps. 5 steps of the policeman is equal to 7 steps of the thief. The ratio of the speeds of the policeman and the thief is

(1) 25 : 28 (2) 25 : 26
(3) 28 : 25 (4) 56 : 25

(SSC CGL Tier-I Exam. 19.10.2014 (Ist Sitting)

27. A got twice as many marks in English as in Science. His total marks in English, Science and Mathematics is 180. If the ratio of his marks in English and Mathematics is 2 : 3, what is his marks in Science ?
(1) 20 (2) 60
(3) 30 (4) 40
(SSC CHSL DEO & LDC Exam. 16.11.2014)

28. 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
(1) 48 : 35 (2) 28 : 15
(3) 24 : 20 (3) 20 : 21
(SSC CHSL DEO & LDC Exam. 16.11.2014)

29. In a library the ratio of story books and other books is 7 : 2 and there are 1512 story books. Due the collection of some more story books the said ratio becomes 15 : 4. The number of story books collected is
(1) 108 (2) 100
(3) 205 (4) 97
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

30. In a 500 metre race, the ratio of speeds of two runners P and Q is 3 : 5. P has a start of 200 metre then the distance between P and Q at the finish of the race is
(1) P wins by 100 metre
(2) Both reach at the same time
(3) Q wins by 100 metre
(4) Q wins by 50 metre
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 IInd Sitting)

31. In a school there were 1554 students and the ratio of the number of the boys and girls was 4 : 3. After a few days, 30 girls joined the school but a 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
(1) 76 (2) 74
(3) 84 (4) 86
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

32. The ratio of the radii of two cylinders is 2 : 3, and the ratio of their heights is 5 : 3. The ratio of their volumes will be
(1) 9 : 4 (2) 20 : 27
(3) 4 : 9 (4) 27 : 20
(SSC CPO Exam. 06.06.2016) (Ist Sitting)

33. In a cricket match there are three types of tickets say A, B and C each costing Rs. 1000, Rs. 500 and Rs. 200 respectively. The ratio of the tickets sold of categories A, B and C is 3 : 2 : 5. If the total collection from selling the tickets is Rs 2.5 crore, find the total number of tickets sold?
(1) 5000 (2) 4800
(3) 50000 (4) 52000
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

34. An office opens at 10 AM and closes at 5 PM. The lunch interval is for 30 minutes. The ratio of lunch interval to the total period of office hours is
(1) 1 : 7 (2) 1 : 14
(3) 7 : 1 (4) 14 : 1
(SSC CGL Tier-I (CBE) Exam. 03.09.2016) (IInd Sitting)

35. The railway fares of air conditioned sleeper and ordinary sleeper class are in the ratio 4 : 1. The number of passengers travelled by air conditioned sleeper and ordinary sleeper classes were in the ratio 3 : 25. If the total collection was Rs. 37,000, how much did air conditioner sleeper passengers pay ?
(1) Rs. 15,000 (2) Rs. 10,000
(3) Rs. 12,000 (4) Rs. 16,000
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (IInd Sitting)

36. The ratio of the amount of work done by $(x-1)$ labours in $(x+1)$ days and that done by $(x+1)$ labours in $(x+2)$ days is 5 : 6. Then the value of x is
(1) 16 (2) 15
(3) 17 (4) 14
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

37. If the ratio of cost price and selling price of an article is 4 : 5, then the percentage of profit will be
(1) 20 (2) 0.1
(3) 10 (4) 25
(SSC CGL Tier-I (CBE) Exam. 03.09.2016 (IInd Sitting)

38. A shopkeeper earns a profit of 15% after selling a book at 20% discount on the printed price. The ratio of the cost price and printed price of the book is :
(1) 20 : 23 (2) 23 : 20
(3) 16 : 23 (4) 23 : 16
(SSC CGL Tier-I (CBE) Exam. 04.09.2016 (IIIrd Sitting)

39. The rates of working of A and B are in the ratio of 2 : 3. The number of days taken by each of them to finish the work is in the ratio :
(1) 2 : 3 (2) 4 : 9
(3) 3 : 2 (4) 9 : 4
(SSC CGL Tier-I (CBE) Exam. 10.09.2016 (IInd Sitting)

40. In an army selection process, the ratio of selected to unselected candidates was 3 : 1. If 80 less had applied and 40 less selected, the ratio of selected to unselected candidates would have been 4 : 1. How many candidates had applied for the process?
(1) 480 (2) 960
(3) 240 (4) 1440
(SSC CHSL (10+2) Tier-I (CBE) Exam. 15.01.2017) (IInd Sitting)

41. In an army selection process, the ratio of selected to unselected candidates was 4:1. If 90 less had applied and 20 less were selected, the ratio of selected to unselected candidates would have been 5:1. How many candidates had applied for the process ?
(1) 1650 (2) 3300
(3) 825 (4) 4950
(SSC CHSL (10+2) Tier-I (CBE) Exam. 16.01.2017) (IInd Sitting)

SHORT ANSWERS

TYPE-I

1. (1)	**2.** (3)	**3.** (3)	**4.** (4)
5. (1)	**6.** (3)	**7.** (1)	**8.** (3)
9. (4)	**10.** (2)	**11.** (4)	**12.** (1)
13. (1)	**14.** (2)	**15.** (3)	**16.** (2)
17. (3)	**18.** (3)	**19.** (4)	**20.** (1)
21. (3)	**22.** (2)	**23.** (2)	**24.** (2)
25. (3)	**26.** (3)	**27.** (3)	**28.** (4)
29. (4)	**30.** (4)	**31.** (1)	**32.** (1)
33. (2)	**34.** (4)	**35.** (1)	**36.** (3)
37. (1)	**38.** (2)	**39.** (3)	**40.** (2)

41. (3)	**42.** (3)	**43.** (3)	**44.** (3)
45. (2)	**46.** (3)	**47.** (2)	**48.** (4)
49. (1)	**50.** (4)	**51.** (2)	**52.** (3)
53. (3)	**54.** (1)	**55.** (4)	**56.** (4)
57. (4)	**58.** (3)	**59.** (3)	**60.** (1)
61. (3)	**62.** (3)	**63.** (1)	**64.** (3)
65. (1)	**66.** (2)	**67.** (4)	**68.** (1)
69. (3)	**70.** (3)	**71.** (1)	**72.** (4)
73. (4)	**74.** (3)	**75.** (2)	**76.** (1)
77. (1)	**78.** (1)	**79.** (1)	**80.** (3)
81. (3)	**82.** (2)	**83.** (1)	**84.** (1)
85. (2)	**86.** (3)	**87.** (3)	**88.** (1)
89. (4)	**90.** (2)	**91.** (3)	**92.** (2)
93. (4)	**94.** (3)	**95.** (2)	**96.** (3)
97. (2)	**98.** (2)	**99.** (2)	**100.** (2)
101. (2)	**102.** (3)	**103.** (2)	**104.** (2)
105. (3)			

TYPE-II

1. (2)	**2.** (1)	**3.** (4)	**4.** (3)
5. (4)	**6.** (3)	**7.** (4)	**8.** (1)
9. (2)	**10.** (2)	**11.** (1)	

TYPE-III

1. (1)	**2.** (1)	**3.** (2)	**4.** (1)
5. (1)			

TYPE-IV

1. (2)	**2.** (3)	**3.** (1)	**4.** (1)
5. (3)	**6.** (2)	**7.** (2)	**8.** (4)
9. (1)	**10.** (3)	**11.** (4)	**12.** (3)
13. (3)	**14.** (2)	**15.** (1)	**16.** (3)
17. (2)	**18.** (3)	**19.** (4)	**20.** (1)
21. (4)	**22.** (3)	**23.** (3)	**24.** (2)
25. (3)	**26.** (2)	**27.** (1)	**28.** (4)
29. (4)	**30.** (1)		

TYPE-V

1. (3)	**2.** (2)	**3.** (3)	**4.** (1)
5. (2)	**6.** (3)	**7.** (4)	**8.** (3)
9. (4)	**10.** (1)	**11.** (1)	**12.** (4)
13. (1)	**14.** (3)	**15.** (2)	**16.** (3)
17. (4)	**18.** (3)	**19.** (1)	**20.** (3)
21. (3)	**22.** (4)	**23.** (2)	**24.** (1)
25. (3)	**26.** (2)	**27.** (3)	**28.** (2)
29. (3)	**30.** (4)	**31**. (4)	**32**. (1)
33. (1)	**34.** (3)	**35.** (1)	**36.** (2)
37. (3)	**38.** (1)	**39.** (2)	**40.** (4)
41. (4)	**42.** (1)		

TYPE-VI

1. (3)	**2.** (4)	**3.** (1)	**4.** (2)
5. (3)	**6.** (1)		

TYPE-VII

1. (3)	**2.** (1)	**3.** (3)	**4.** (3)
5. (2)	**6.** (2)	**7.** (3)	**8.** (3)
9. (1)	**10.** (3)	**11.** (4)	**12.** (1)
13. (4)	**14.** (2)	**15.** (3)	**16.** (1)
17. (4)	**18.** (3)	**19.** (2)	**20.** (3)
21. (1)	**22.** (3)	**23.** (4)	**24.** (1)
25. (2)	**26.** (2)	**27.** (4)	**28.** (3)
29. (3)	**30.** (1)	**31.** (2)	

TYPE-VIII

1. (1)	**2**. (3)	**3.** (4)	**4.** (1)
5. (1)	**6.** (2)	**7.** (3)	**8.** (3)
9. (1)	**10.** (4)	**11.** (4)	**12.** (3)
13. (1)	**14.** (3)	**15.** (2)	**16.** (2)
17. (4)	**18.** (4)	**19.** (1)	**20.** (4)
21. (1)	**22.** (2)	**23.** (4)	**24.** (4)
25. (3)	**26.** (2)	**27.** (1)	**28.** (3)
29. (4)	**30.** (3)	**31.** (3)	**32.** (1)
33. (2)	**34.** (4)	**35.** (1)	**36.** (4)
37. (1)	**38.** (1)	**39.** (4)	**40.** (2)
41. (1)	**42.** (2)	**43.** (3)	**44.** (2)
45. (2)	**46.** (3)	**47.** (4)	**48.** (3)
49. (3)	**50.** (2)	**51.** (1)	**52.** (4)
53. (1)	**54.** (4)	**55.** (4)	**56.** (4)
57. (4)	**58.** (2)	**59.** (3)	**60.** (3)
61. (1)	**62.** (2)	**63.** (4)	**64.** (1)
65. (2)	**66.** (2)	**67.** (2)	**68.** (2)
69. (3)	**70.** (3)	**71.** (1)	**72.** (2)
73. (3)	**74.** (2)	**75.** (3)	**76.** (2)
77. (2)	**78.** (2)	**79.** (2)	**80.** (1)
81. (4)	**82.** (4)		

TYPE-IX

1. (1)	**2.** (4)	**3.** (4)	**4.** (1)
5. (4)	**6.** (1)	**7.** (3)	**8.** (3)
9. (2)	**10.** (1)	**11.** (3)	**12.** (3)
13. (2)	**14.** (1)	**15**. (4)	**16.** (1)
17. (2)	**18.** (2)	**19.** (1)	**20.** (4)
21. (3)	**22.** (3)	**23.** (2)	**24.** (4)
25. (3)	**26.** (1)	**27.** (1)	**28.** (2)
29. (4)	**30.** (3)		

TYPE-X

1. (2)	**2.** (1)	**3.** (2)	**4.** (3)
5. (2)	**6.** (2)	**7.** (4)	**8.** (3)
9. (2)	**10.** (1)	**11.** (3)	**12.** (4)
13. (2)	**14.** (3)	**15.** (2)	**16.** (3)

TYPE-XI

1. (4)	**2.** (3)	**3.** (1)	**4.** (2)
5. (1)	**6.** (1)	**7.** (4)	**8.** (4)
9. (2)	**10.** (4)	**11.** (4)	**12.** (4)
13. (4)	**14.** (3)	**15.** (2)	**16.** (1)
17. (3)	**18.** (2)	**19.** (4)	**20.** (2)
21. (2)	**22.** (2)	**23.** (2)	**24.** (2)
25. (3)	**26.** (3)	**27.** (2)	**28.** (4)
29. (1)	**30.** (1)	**31**. (2)	**32**. (3)
33. (4)	**34.** (1)	**35.** (3)	**36.** (4)
37. (1)	**38.** (2)	**39.** (1)	**40.** (4)
41. (2)	**42.** (3)	**43.** (4)	**44.** (1)
45. (2)	**46.** (3)	**47.** (3)	**48.** (1)
49. (1)	**50.** (1)		

TYPE-XII

1. (3)	**2.** (3)	**3.** (3)	**4.** (1)
5. (4)	**6.** (3)	**7.** (1)	**8.** (1)
9. (1)	**10.** (1)	**11.** (3)	**12.** (2)
13. (4)	**14.** (3)	**15.** (3)	**16.** (2)
17. (1)	**18.** (4)	**19.** (3)	**20.** (3)
21. (2)	**22.** (1)	**23.** (4)	**24.** (2)
25. (2)	**26.** (3)	**27.** (3)	**28.** (4)
29. (1)	**30.** (2)	**31**. (1)	**32.** (2)
33. (3)	**34.** (2)	**35.** (3)	**36.** (1)
37. (4)	**38.** (3)	**39.** (3)	**40.** (1)
41. (1)			

EXPLANATIONS

TYPE-I

1. (1) a : c = (a : b) × (b : c)

$= \frac{7}{9} \times \frac{15}{7} = \frac{15}{9}$ = 5 : 3

Aliter : Using Rule 18,

A : C = 7 × 15 : 9 × 7 = 5 : 3

2. (3) $x = \frac{1}{3}y \Rightarrow x : y = 1 : 3$

Again, $y = \frac{1}{2}z \Rightarrow y : z$

= 1 : 2 = 3 : 6

$\therefore$ x : y : z = 1 : 3 : 6

3. (3) Using Rule 33,

If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$, then each of these ratios is equal to $\frac{a+c+e}{b+d+f}$

Here,

$\frac{p}{q} = \frac{r}{s} = \frac{t}{u} = \frac{2}{3}$

$\Rightarrow \frac{mp}{mq} = \frac{nr}{ns} = \frac{ot}{ou} = \frac{2}{3}$

$\Rightarrow \frac{mp+nr+ot}{mq+ns+ou} = \frac{2}{3}$ or 2 : 3

4. (4) Using Rule 33,

$\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{1}{2}$

$\Rightarrow \frac{pa}{pb} = \frac{qc}{qd} = \frac{re}{rf} = \frac{1}{2}$

$\Rightarrow \frac{pa+qc+re}{pb+qd+rf} = \frac{1}{2}$ or 1 : 2

5. (1) Using Rule 13,

$\frac{x}{y} = \frac{3}{1} \Rightarrow \frac{x^3}{y^3} = \frac{27}{1}$

$\Rightarrow \frac{x^3-y^3}{x^3-y^3} = \frac{27-1}{27+1}$

[By componendo and dividendo]

$= \frac{26}{28} = \frac{13}{14}$ = 13 : 14

6. (3) Let the fourth proportional be x

Then, $\frac{0.12}{0.21} = \frac{8}{x}$

or $x = 8 \times \frac{0.21}{0.12}$

or $x = 8 \times \frac{21}{12}$

or x = 14

Aliter : Using Rule 16,

Fourth proportion = $\frac{bc}{a}$

$= \frac{0.21 \times 18}{0.12}$ = 14

7. (1) Required ratio = $\frac{2^{1.5}}{2^{0.5}}$

$= \frac{2^{1.5-0.5}}{1}$

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

8. (3) $\frac{m}{n} = \frac{3}{2}$ (Given)

$\therefore \frac{4m+5n}{4m-5n} = \frac{4\left(\frac{m}{n}\right)+5}{4\left(\frac{m}{n}\right)-5}$

$= \frac{4 \times \frac{3}{2}+5}{4 \times \frac{3}{2}-5} = \frac{6+5}{6-5} = 11:1$

9. (4) A : D = $\frac{A}{D} = \frac{A}{B} \times \frac{B}{C} \times \frac{C}{D}$

$= \frac{3}{4} \times \frac{5}{7} \times \frac{8}{9} = \frac{10}{21}$ = 10 : 21

Aliter : Using Rule 19,

A : D = xpm : yqn

= 3 × 5 × 8 : 4 × 7 × 9

= 10 : 21

10. (2) Using Rule 19 (ii),

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

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

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

$\Rightarrow c : d$ = 6 : 7

Thus,

$a : b$ = 2 : 3

$b : c$ = 4 : 5

$c : d$ = 6 : 7

$a : b : c : d = 2 \times 4 \times 6 : 3 \times 4 \times 6 : 3 \times 5 \times 6 : 3 \times 5 \times 7$

= 16 : 24 : 30 : 35

11. (4) Since b is the mean proportional of a and c.

$\therefore \frac{a}{b} = \frac{b}{c} = k$ (Suppose)

$\therefore a = bk$, $b = ck$

$\therefore \frac{(a-b)^3}{(b-c)^3} = \frac{(bk-b)^3}{(ck-c)^3}$

$= \frac{b^3(k-1)^3}{c^3(k-1)^3} = \frac{b^3}{c^3} = \frac{a^3}{b^3}$

12. (1) Ratio = $\frac{1}{2} : \frac{1}{3} : \frac{1}{5}$

$= \frac{1}{2} \times 30 : \frac{1}{3} \times 30 : \frac{1}{5} \times 30$

= 15 : 10 : 6

Sum of the ratios

= 15 + 10 + 6 = 31

$\therefore$ First part = ₹ $\frac{15}{31} \times 6200$

= ₹ 3000

Second part = ₹. $\frac{10}{31} \times 6200$

= ₹ 2000

Third part = ₹ $\frac{6}{31} \times 6200$

= ₹ 1200

13. (1) First part = x and second part = $94 - x$

$\therefore \frac{\frac{x}{5}}{\frac{94-x}{8}} = \frac{3}{4}$

$\Rightarrow \frac{x}{5} \times \frac{8}{(94-x)} = \frac{3}{4}$

$\Rightarrow 32x = 15 \times 94 - 15x$

$\Rightarrow 47x = 15 \times 94$

$\Rightarrow x = \frac{15 \times 94}{47} = 30$

14. (2) $\frac{a}{b} = \frac{5}{7}, \frac{c}{d} = \frac{2a}{3b}$

$\Rightarrow \frac{a}{b} \times \frac{c}{d} = \frac{5}{7} \times \frac{2a}{3b}$

$\Rightarrow \frac{ac}{bd} = \frac{10}{21} \times \frac{5}{7} = \frac{50}{147}$

= 50 : 147

15. (3) $x : y = 3 : 2$

$\Rightarrow x^2 : y^2 = 9 : 4$

$$\therefore \frac{2x^2+3y^2}{3x^2-2y^2} = \frac{2\frac{x^2}{y^2}+3}{3\frac{x^2}{y^2}-2}$$

$$= \frac{2\times\frac{9}{4}+3}{3\times\frac{9}{4}-2} = \frac{\frac{18+12}{4}}{\frac{27-8}{4}}$$

$= 30 : 19$

16. (2) $\frac{a}{b} = \frac{b}{c}$

$\Rightarrow b^2 = ac \Rightarrow b^4 = a^2c^2$

$$\therefore \frac{a^4}{b^4} = \frac{a^4}{a^2c^2} = \frac{a^2}{c^2}$$

17. (3) A : B $= \frac{1}{2} : \frac{3}{8}$ $= 4 : 3 = 8 : 6$

B : C $= \frac{1}{3} : \frac{5}{9} = 3 : 5 = 6 : 10$

C : D $= \frac{5}{6} : \frac{3}{4} = 10 : 9$

$\therefore$ A : B : C : D $= 8 : 6 : 10 : 9$

18. (3) A : B : C $= 2 : 3 : 4$

$$\therefore \frac{A}{B} = \frac{2}{3}, \frac{B}{C} = \frac{3}{4}, \frac{C}{A} = \frac{4}{2} = 2$$

$$\therefore \frac{A}{B} : \frac{B}{C} : \frac{C}{A} = \frac{2}{3} : \frac{3}{4} : \frac{2}{1}$$

$= 8 : 9 : 24$

19. (4) $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{1}{2}$

$$\therefore \frac{3a}{3b} = \frac{5c}{5d} = \frac{7e}{7f} = \frac{1}{2}$$

$$\therefore \frac{3a+5c+7e}{3b+5d+7f} = \frac{1}{2} = 1 : 2$$

20. (1) $a : (b+c) = 1 : 3$

$$\Rightarrow \frac{b+c}{a} = \frac{3}{1} \Rightarrow \frac{b+c}{a}+1 = \frac{3}{1}+1$$

$$\Rightarrow \frac{a+b+c}{a} = \frac{3+1}{1} = \frac{4}{1} \ldots\ldots \text{(i)}$$

Similarly,

$$\frac{a+b}{c} = \frac{7}{5}$$

$$\Rightarrow \frac{a+b+c}{c} = \frac{12}{5} \ldots\ldots \text{(ii)}$$

On dividing (i) by (ii),

$$\frac{c}{a} = \frac{4\times5}{12} = \frac{5}{3} = k \ldots\ldots \text{(iii)}$$

From equation (i), b = 4k

$$\therefore \frac{b}{a+c} = \frac{4k}{3k+5k} = 1 : 2$$

21. (3) $\frac{p}{1} = \frac{q}{2} = \frac{r}{4} = k$ (let)

$\Rightarrow p = k,\ q = 2k,\ r = 4k$

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

$$= \sqrt{5k^2+4k^2+16k^2} = \sqrt{25k^2}$$

$= 5k = 5p$

22. (2) Using Rule 14,

Mean proportional

$$= \sqrt{\left(3+\sqrt{2}\right)\left(12-\sqrt{32}\right)}$$

$$= \sqrt{\left(3+\sqrt{2}\right)4\left(3-\sqrt{2}\right)}$$

$$= 2\sqrt{9-2} = 2\sqrt{7}$$

23. (2) Given, $\frac{x}{y} = \frac{2}{3}$ ..... (i)

$$\text{Expression} = \frac{3x+2y}{9x+5y}$$

$$= \frac{3.\frac{x}{y}+2}{9\frac{x}{y}+5} = \frac{3\times\frac{2}{3}+2}{9\times\frac{2}{3}+5} \text{ [from (i)]}$$

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

24. (2) We can write $a : c$ by compounding $a : b$ and $b : c$

$$\frac{a}{c} = \frac{a}{b}\times\frac{b}{c}, \frac{a}{c} = \frac{3}{4}\times\frac{8}{9}, \frac{a}{c} = \frac{2}{3}$$

$\Rightarrow a : c = 2 : 3$

Aliter : Using Rule 18 (i),

A : C = xp : yq

$= 3 \times 8 : 4 \times 9 = 2 : 3$

25. (3) $a : b : c = 2 : 3 : 4$

$$\therefore \frac{a}{2} = \frac{b}{3} = \frac{c}{4} = k \text{ (let)}$$

$\Rightarrow a = 2k$, $b = 3k$, and $c = 4k$

Given $2a - 3b + 4c = 33$

$\Rightarrow 2 \times 2k - 3\times3k + 4 \times4k = 33$

$\Rightarrow 4k - 9k + 16k = 33$

$\Rightarrow 11k = 33 \Rightarrow k = \frac{33}{11} = 3$

$\therefore c = 4k = 4\times3 = 12$

26. (3) $a : b = c : d$

$$\Rightarrow \frac{a}{b} = \frac{c}{d} = \frac{ma}{mb} = \frac{nc}{nd}$$

$$\Rightarrow \frac{a+c}{b+d} = \frac{ma+nc}{mb+nd}$$

27. (3) A : B $= 4 : 5$

B : C $= 2 : 3$

$\therefore$ A : B : C $= 4 \times 2 : 5 \times 2 : 5 \times 3$

$= 8 : 10 : 15$

If A equals 800, then C equals 1500.

28. (4) $a : b : c = 7 : 3 : 5$

$$\Rightarrow \frac{a}{7} = \frac{b}{3} = \frac{c}{5} = k \text{ (let)}$$

$\Rightarrow a = 7k$, $b = 3k$, $c = 5k$

Now $(a + b + c) : (2a + b - c)$

$= (7k + 3k + 5k) : (2 \times7k + 3k - 5k)$

$= 15\ k : 12\ k = 5 : 4$

29. (4) Using Rule 18(ii),

A : B $= 2 : 3$

B : C $= 4 : 5$

$\therefore$ A : B : C $= 2 \times 4 : 3 \times 4 : 3 \times 5$

$= 8 : 12 : 15$

30. (4) According to the question,

$$2\text{ A} = 3\text{ B} \Rightarrow \text{B} = \frac{2}{3}\text{ A}$$

and $2A = 4C \Rightarrow$ C $= \frac{1}{2}$ A

$$\therefore \text{ A : B : C} = \text{A} : \frac{2}{3}\text{ A} : \frac{1}{2}\text{A}$$

$$= 1 : \frac{2}{3} : \frac{1}{2} = 6 : 4 : 3$$

31. (1) $\frac{A}{B}\times\frac{B}{C}\times\frac{C}{D} = \frac{2}{3}\times\frac{2}{4}\times\frac{2}{5}$

$$\Rightarrow \frac{A}{D} = \frac{2}{15} = 2 : 15$$

Aliter : Using Rule 19(i),

A : D = xpm : yqn

$= 2 \times 2 \times 2 : 3 \times 4 \times 5$

$= 2 : 15$

32. (1) $\frac{a}{3} = \frac{b}{4} = \frac{c}{7} = k$

$\Rightarrow a = 3k$, b $= 4k$ and $c = 7k$

$$\Rightarrow \frac{a+b+c}{c} = \frac{3k+4k+7k}{7k}$$

$$= \frac{14k}{7k} = \frac{2}{1} = 2 : 1$$

33. (2) A : B = 3 : 4 = 9 : 12
B : C = 12 : 13
∴ A : B : C = 9 : 12 : 13
⇒ A : C = 9 : 13
Aliter : Using Rule 18 (i),
A : C = xp : yq
= 3 × 12 : 4 × 13
= 9 : 13

34. (4) A : B = 3 : 2
B : C = 3 : 4
∴ A : B : C = 3 × 3 : 2 × 3 : 2 × 4
= 9 : 6 : 8
∴ A : C = 9 : 8
Aliter : Using Rule 18(i),
A : C = xp : yq
= 3 × 3 : 2 × 4 = 9 : 8

35. (1) Here, $\frac{x}{y}=\frac{2}{1} \Rightarrow \frac{x^2}{y^2}=\frac{4}{1}$

$$\therefore \frac{x^2-y^2}{x^2+y^2}=\frac{\frac{x^2}{y^2}-1}{\frac{x^2}{y^2}+1}$$

$$=\frac{4-1}{4+1}=\frac{3}{5} = 3:5$$

36. (3) A's share

$= ₹ \left(\frac{3}{5}\times 1000\right) = ₹\ 600$

Aliter : Using Rule 22,

Part of A= $\frac{m}{m+n}\times R$

$= \frac{3}{3+2}\times 1000$

= ₹ 600

37. (1) Tricky Approach

$\frac{W_1}{W_2}=\frac{2}{3}$

$\Rightarrow \frac{W_2}{W_1}=\frac{3}{2}$ and $\frac{W_1}{W_3}=\frac{1}{2}$

$\therefore \frac{W_2}{W_1}\times\frac{W_1}{W_3}=\frac{W_2}{W_3}=\frac{3}{2}\times\frac{1}{2}=\frac{3}{4}$
= 3 : 4

38. (2) $3x = 5y = 4z$
LCM of 3, 5 and 4 = 60

$\therefore \frac{3x}{60}=\frac{5y}{60}=\frac{4z}{60}$

$\Rightarrow \frac{x}{20}=\frac{y}{12}=\frac{z}{15}$

$\therefore$ $x : y : z = 20 : 12 : 15$

39. (3) $\frac{A}{B}\times\frac{B}{C}=\frac{3}{4}\times\frac{6}{5}$

$\Rightarrow \frac{A}{C}=\frac{9}{10} \Rightarrow \frac{C}{A}=\frac{10}{9}$

$\Rightarrow \frac{C}{A}+1=\frac{10}{9}+1$

$= \frac{C+A}{A}=\frac{10+9}{9} = \frac{19}{9}$

⇒ A : (A + C) = 9 : 19

40. (2) $a + b\sqrt{3}$

$=\frac{1}{2-\sqrt{3}} = 2+\sqrt{3}$

(After rationalising)

⇒ $a = 2$ and $b = 1$

$\therefore$ $a : b = 2 : 1$

41. (3) A : B = 3 : 4 = 6 : 8
B : C = 8 : 9
∴ A : B : C = 6 : 8 : 9
Aliter : Using Rule 18(ii),
A : B : C = xp : yp : qy
= 3 × 8 : 4 × 8 : 9 × 4
= 24 : 32 : 36
= 6 : 8 : 9

42. (3) Ratio = $1 : \frac{1}{3} : \frac{1}{6}$
= 6 : 2 : 1
Sum of the ratios = 6 + 2+1 = 9

$\therefore$ Middle part = $\frac{2}{9}\times 78$

$= \frac{52}{3} = 17\frac{1}{3}$

43. (3) $\frac{x}{y}=\frac{4}{5}$

$$\therefore \frac{3x+y}{5x+3y}=\frac{3\left(\frac{x}{y}\right)+1}{5\left(\frac{x}{y}\right)+3}$$

$$=\frac{3\times\frac{4}{5}+1}{5\times\frac{4}{5}+3}=\frac{12+5}{5}=\frac{17}{35}=17:35$$

44. (3) $\frac{x}{y}=\frac{5}{6}$

$$\therefore \frac{3x^2-2y^2}{y^2-x^2}=\frac{3.\frac{x^2}{y^2}-2}{1-\frac{x^2}{y^2}}$$

$$=\frac{3\times\frac{25}{36}-2}{1-\frac{25}{36}}=\frac{75-72}{36-25}=\frac{3}{11}$$
= 3 : 11

45. (2) $\frac{x}{y}=\frac{3}{4}$ (Given)

$$\therefore \frac{4x+5y}{5x-2y}=\frac{4\frac{x}{y}+5}{5\frac{x}{y}-2}$$

$$=\frac{4\times\frac{3}{4}+5}{5\times\frac{3}{4}-2}=\frac{8}{\frac{15-8}{4}}$$

$= \frac{8\times 4}{7}=\frac{32}{7}$

46. (3) A : B = 2 : 3 = 4 : 6
B : C = 6 : 11
∴ A : B : C = 4 : 6 : 11
Aliter : Using Rule 18 (ii),
A : B : C = xp : yp : qy
= 2 × 6 : 3 × 6 : 3 × 11
= 12 : 18 : 33
= 4 : 6 : 11

47. (2) $A\times\frac{2}{3}=B\times\frac{4}{5}$

$\Rightarrow \frac{A}{B}=\frac{4}{5}\times\frac{3}{2} = 6:5$

48. (4) According to the question,

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

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

Now, $A\times\frac{2}{3}=B\times\frac{3}{4}$

$\Rightarrow \frac{A}{B}=\frac{3}{4}\times\frac{3}{2}=\frac{9}{8} \Rightarrow A:B=9:8$

and $B\times\frac{3}{4}=C\times\frac{3}{5}$

$\Rightarrow \frac{B}{C} = \frac{3}{5} \times \frac{4}{3} = \frac{4}{5} = \frac{8}{10}$

= B : C = 8 : 10

$\therefore$ A : B : C = 9 : 8 : 10

49. (1) A : B = 3 : 7

B : C = 6 : 5

A : B : C = 3×6 : 7×6 : 7×5

= 18 : 42 : 35

Sum of the ratios

= 18 + 42 + 35 = 95

$\therefore$ B's share

$= ₹\left(\frac{42}{95} \times 33630\right) = ₹14868$

50. (4) A : B = 3 : 5 = 12 : 20

B : C = 4 : 7 = 20 : 35

$\therefore$ A : B : C = 12 : 20 : 35

Aliter : Using Rule 18 (ii),

A : B : C = xp : yp : qy

= 3 × 4 : 5 × 4 : 5 × 7

= 12 : 20 : 35

51. (2) $\frac{A}{B} = \frac{4}{5}$; $\frac{B}{C} = \frac{5}{2}$

$\therefore \frac{A}{C} = \frac{A}{B} \times \frac{B}{C} = \frac{4}{5} \times \frac{5}{2} = 2:1$

Aliter : Using Rule 18 (i),

A : B = 4 : 5, B : C = 5 : 2

A : C = 4 × 5 : 5 × 2

= 20 : 10 = 2 : 1

52. (3) $A = \frac{1}{4} B$

$\Rightarrow$ A : B = 1 : 4

B : C = 1 : 2 = 4 : 8

$\therefore$ A : B : C = 1:4: 8

Aliter : Using Rule 18(ii),

A : B= 1 : 4, B : C = 1 : 2

A : B : C= 1 × 1 : 4 × 1 : 4 × 2

= 1 : 4 : 8

53. (3) 2A = 3B = 4C

$\Rightarrow \frac{2A}{12} = \frac{3B}{12} = \frac{4C}{12}$

$\Rightarrow \frac{A}{6} = \frac{B}{4} = \frac{C}{3}$

$\Rightarrow$ A : B : C = 6 : 4 : 3

54. (1) $4^{3.5} : 2^5 = 4^3 \times 4^{0.5} : 32$

= 64 × 2 : 32 = 4 : 1

55. (4) Using Rule 20,

A : B = 1 : 2 = 3 : 6

B : C = 3 : 4 = 6 : 8

C : D = 6 : 9 = 2 : 3 = 8 : 12

D : E = 12 : 16

$\therefore$ A : B : C : D : E

= 3 : 6 : 8 : 12 : 16

56. (4) $\frac{x}{y} = \frac{2}{5}$ (Given)

$\therefore \frac{5x+3y}{5x-3y} = \frac{5\left(\frac{x}{y}\right)+3}{5\left(\frac{x}{y}\right)-3}$

(Dividing numerator and denominator by y)

$= \frac{5 \times \frac{2}{5} + 3}{5 \times \frac{2}{5} - 3} = \frac{2+3}{2-3} = -5$

Aliter : Using Rule 23,

Marks of Q = $\frac{n}{m} \times R$

(Where m = 2, n = 5, R = 120)

$= \frac{5}{2} \times 120 = 300$

57. (4) $a : b = 2 : 3$

$b : c = 4 : 5$

$\therefore a : b : c = 2 \times 4 : 3 \times 4 : 3 \times 5$

= 8 : 12 : 15

$\therefore \frac{a+b}{b+c} = \frac{8+12}{12+15} = \frac{20}{27}$

= 20 : 27

58. (3) Marks of Q = $\frac{5}{2} \times 120 = 300$

59. (3) A : B = 4 : 9

A : C = 2 : 3 = 4 : 6

$\therefore \frac{A+B}{A+C} = \frac{4+9}{4+6} = \frac{13}{10}$

60. (1) If the third proportional be x, then

0.8 : 0.2 : : 0.2 : x

$\Rightarrow 0.8 \times x = 0.2 \times 0.2$

$\Rightarrow x = \frac{0.2 \times 0.2}{0.8} = \frac{4}{80} = 0.05$

Aliter :

Third proportion

$= \frac{b^2}{a} = \frac{(0.2)^2}{0.8}$

$= \frac{0.04}{0.8} = 0.05$

61. (3) $\frac{x}{y} = \frac{3}{4}$ (Given)

$\therefore \frac{5x-2y}{7x+2y} = \frac{5\frac{x}{y}-2}{7\frac{x}{y}+2}$

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

62. (3) As given,

2A = 3B

$\Rightarrow$ A : B = 3 : 2

and, 4B = 5C

$\Rightarrow$ B : C = 5 : 4

$\therefore$ A : B : C

= 3 × 5 : 2 × 5 : 2 × 4

= 15 : 10 : 8

$\therefore$ A : C = 15 : 8

Aliter : Using Rule 18 (i),

Here, 2A = 3B i,eA : B = 3 : 2

4B = 5C i,e B : C = 5 : 4

A : C = xp : yq

= 3 × 5 : 2 × 4

= 15 : 8

63. (1) Number of students in class A = x

Number of students in class B = y

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

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

$\Rightarrow 30x - 25x = 40y - 30y$

$\Rightarrow 5x = 10y$

$\Rightarrow \frac{x}{y} = \frac{10}{5} = 2 : 1$

64. (3) Ratio of values

= 15 × 3 : 10 × 2 : 5 × 5

= 45 : 20 : 25

$\therefore$ Required average cost

$= \frac{45+20+25}{10} = \frac{90}{10} = ₹ 9$

65. (1) Boys : Girls

= 4 : 3 = 32 : 24

Girls : Teachers

= 8 : 1 = 24 : 3

$\therefore$ Boys : Girls : Teachers

= 32 : 24 : 3

$\therefore$ Required ratio

= (32 + 24) : 3 = 56 : 3

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

$\Rightarrow 10x - 4 = 9x + 15$

$\Rightarrow 10x - 9x = 15 + 4 = 19$

$\Rightarrow x = 19$

67. (4) A : B = 5 : 3

B : C = 4 : 5

$\therefore$ A : B : C

= 5 × 4 : 3 × 4 : 3 × 5

= 20 : 12 : 15

Sum of ratios

= 20 + 12 + 15 = 47

$\therefore$ Runs scored by B

$= \frac{12}{47} \times 564 = 144$

68. (1) $\frac{a+b}{6}=\frac{b+c}{7}=\frac{c+a}{8}=k$

$\Rightarrow a+b=6k;\ b+c=7k;$
$c+a=8k$
$\therefore a+b+b+c+c+a$
$=6k+7k+8k$
$\Rightarrow 2(a+b+c)=21k$

$\Rightarrow 2\times 14=21k \Rightarrow k=\frac{4}{3}$

$\therefore c=(a+b+c)-(a+b)$

$=14-6\times\frac{4}{3}=14-8=6$

69. (3) $a\times 5.5=b\times 0.65$

$\Rightarrow \frac{a}{b}=\frac{0.65}{5.5}=\frac{65}{550}=\frac{13}{110}$

70. (3) Original number of boys
$=5x$
Original number of girls $=3x$

$\therefore \frac{5x-50}{3x+50}=\frac{9}{7}$

$\Rightarrow 35x-350=27x+450$
$\Rightarrow 35x-27x=350+450$
$\Rightarrow 8x=800$
$\Rightarrow x=100$
Number of boys $=5x$
$=5\times 100=500$

71. (1) A : B : C

$=\frac{1}{3}:\frac{1}{4}:\frac{1}{5}:\frac{1}{6}$

$=\frac{1}{3}\times 60:\ \frac{1}{4}\times 60:\ \frac{1}{5}\times 60:\ \frac{1}{6}\times 60$

[LCM of 3, 4, 5 & 6 = 60]
$=20:15:12:10$
$\therefore$ Minimum number of pens
$=20+15+12+10=57$

72. (4) $A=B\times\frac{2}{3}$

$\Rightarrow A:B=2:3=8:12$

$B=C\times\frac{4}{5}$

$\Rightarrow B:C=4:5=12:15$
$\therefore A:B:C=8:12:15$

Aliter : Using Rule 18 (ii),
Here, A : B = 2 : 3, B : C = 4 : 5
A : B : C = xp : yp : qy
$=2\times 4:3\times 4:5\times 3$
$=8:12:15$

73. (4) $25^{2.5}:5^3$
$=(5^2)^{2.5}:5^3$
$=5^5:5^3$
$=5^2:1$
$=25:1$

74. (3) Third proportional of 12 and $18=x$
$\therefore\ 12:18=18:x$

$\Rightarrow x=\frac{18\times 18}{12}=27$

Aliter : Using Rule 15,

Third proportion $=\frac{b^2}{a}=\frac{18^2}{12}$

$=\frac{18\times 18}{12}=27$

75. (2) $x:y=3:2=9:6$
$y:z=3:2=6:4$
$\therefore x:y:z=9:6:4$
$\therefore 9a+6a+4a=342$
$\Rightarrow 19a=342$
$\Rightarrow a=342\div 19=18$
$\therefore A\Rightarrow 18\times 9=162$
$B\Rightarrow 18\times 6=108$
$C\Rightarrow 18\times 4=72$

76. (1) $\frac{A}{B}=\frac{3}{4},\ \frac{B}{C}=\frac{6}{5}$

$\Rightarrow \frac{A}{B}\times\frac{B}{C}=\frac{3}{4}\times\frac{6}{5}=\frac{9}{10}$

$\Rightarrow \frac{A}{C}=\frac{9}{10}\Rightarrow\frac{C}{A}=\frac{10}{9}$

Aliter : Using Rule 18(i),
A : C = xp : yq
$=3\times 6:4\times 5$
$=18:20$
A : C = 9 : 10
$\therefore$ C : A = 10 : 9

77. (1) $\frac{2}{x}=\frac{y}{54}$

$\Rightarrow xy=2\times 54=6\times 18$

78. (1) $\frac{12}{9}=\frac{16}{12}$

$\Rightarrow 12\times 12=9\times 16$
$\Rightarrow 144=144.$

79. (1) $\frac{18}{x}=\frac{x}{50}$

$\Rightarrow x^2=18\times 50$
$=900$

$\Rightarrow x=\sqrt{900}=30$

80. (3) A : B = 7 : 9
B : C = 3 : 5
$\therefore$ A : B : C
$=7\times 3:9\times 3:9\times 5$
$=7:9:15$

Aliter : Using Rule 18(ii),
A : B : C = xp : py : qy
$=7\times 3:9\times 3:5\times 9$
$=21:27:45$
$=7:9:15$

81. (3) $\frac{x}{y}=\frac{5}{2}$ (Given)

Expression $=\frac{8x+9y}{8x+2y}$

$=\frac{\frac{8x+9y}{y}}{\frac{8x+2y}{y}}$

$=\frac{8\frac{x}{y}+9}{8\frac{x}{y}+2}=\frac{8\times\frac{5}{2}+9}{8\times\frac{5}{2}+2}$

$=\frac{20+9}{20+2}=\frac{29}{22}=29:22$

82. (2) Length : breadth $=5:2$
Breadth = 40 metre

$\therefore$ Length $=\frac{5}{2}\times 40=100$ metre

83. (1) $\frac{2}{x}=\frac{4}{8}\Rightarrow 4x=2\times 8$

$\Rightarrow x=\frac{2\times 8}{4}=4$

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

$\Rightarrow \frac{4}{y}=\frac{2}{3}$

$\Rightarrow 2y=4\times 3$

$\Rightarrow y=\frac{4\times 3}{2}=6$

84. (1) $\frac{a+b}{\sqrt{ab}}=\frac{4}{1}\Rightarrow\frac{a+b}{2\sqrt{ab}}=\frac{2}{1}$

By componendo and dividendo,

$\frac{a+b+2\sqrt{ab}}{a+b-2\sqrt{ab}}=\frac{3}{1}$

$\Rightarrow \frac{\left(\sqrt{a}+\sqrt{b}\right)^2}{\left(\sqrt{a}-\sqrt{b}\right)^2}=\frac{\left(\sqrt{3}\right)^2}{(1)^2}$

$\Rightarrow \frac{\sqrt{a}+\sqrt{b}}{\sqrt{a}-\sqrt{b}}=\frac{\sqrt{3}}{1}$

Again using componendo and dividendo,

$$\frac{2\sqrt{a}}{2\sqrt{b}} = \frac{\sqrt{3}+1}{\sqrt{3}-1}$$

$$\Rightarrow \frac{\sqrt{a}}{\sqrt{b}} = \frac{\sqrt{3}+1}{\sqrt{3}-1}$$

On squaring both sides

$$\frac{a}{b} = \left(\frac{\sqrt{3}+1}{\sqrt{3}-1}\right)^2 = \frac{3+1+2\sqrt{3}}{3+1-2\sqrt{3}}$$

$$= \frac{4+2\sqrt{3}}{4-2\sqrt{3}} = \frac{2+\sqrt{3}}{2-\sqrt{3}}$$

$$= 2+\sqrt{3} : 2-\sqrt{3}$$

85. (2)

Monkey	Banana	Time
12 ↑	12 ↓	12 ↓
4 ↑	4 ↓	x ↓

$$\therefore \left.\begin{matrix} 4:12 \\ 12:4 \end{matrix}\right\} :: 12 : x$$

$\Rightarrow 4 \times 12 \times x = 12 \times 12 \times 4$

$$\Rightarrow x = \frac{12\times12\times4}{4\times12}$$

= 12 minutes

86. (3) Let x be added to each term.
According to the question,

$$\frac{2+x}{5+x} = \frac{5}{6}$$

$\Rightarrow 12 + 6x = 25 + 5x$
$\Rightarrow 6x - 5x = 25 - 12$
$\Rightarrow x = 13$

87. (3) A : B = 2 : 3
B : C = 3 : 7
$\therefore$ A : B : C = 2 : 3 : 7
$\therefore$ A = 2k, B = 3k, C = 7k
$\therefore$ A + B = 5k; B + C = 10k,
C + A = 9k
$\therefore$ Required ratio = 5k : 10k : 9k
= 5 : 10 : 9

88. (1) $\dfrac{x^3-y^3}{x^2+xy+y^2} = \dfrac{5}{1}$

$$\Rightarrow \frac{(x-y)(x^2+xy+y^2)}{x^2+xy+y^2} = 5$$

$\Rightarrow x - y = 5$ ....(i)
Again,

$$\frac{x^2-y^2}{x-y} = 7$$

$$\Rightarrow \frac{(x+y)(x-y)}{x-y} = 7$$

$\Rightarrow x + y = 7$ ....(ii)
On adding equations (i) and (ii),
$2x = 12 \Rightarrow x = 6$
From equation (ii),
$x + y = 7 \Rightarrow y = 7 - 6 = 1$

$$\therefore \frac{2x}{3y} = \frac{2\times6}{3\times1} = 4 : 1$$

89. (4) A : B = 2 : 1
A : C = 1 : 3 = 2 : 6
$\therefore$ A : B : C = 2 : 1 : 6

90. (2) $\dfrac{1\cdot21}{x} = \dfrac{x}{0.09}$
Where = x = mean Proportion

$\Rightarrow x^2 = 1.21 \times 0.09$

$\Rightarrow x^2 = 1.1 \times 1.1 \times 0.3 \times 0.3$

$\Rightarrow x = 1.1 \times 0.3 = 0.33$

91. (3) According to the question,
$x = 2k$
$y = 3k$
$z = 5k$
$\because x + y + z = 80$
$\Rightarrow 2k + 3k + 5k = 80$
$\Rightarrow 10k = 80$

$$\Rightarrow k = \frac{80}{10} = 8$$

$\therefore x = 2 \times 8 = 16$
$y = 3 \times 8 = 24$
$z = 5 \times 8 = 40$
$\therefore z = ax - 8$
$\Rightarrow 40 = a \times 16 - 8$
$\Rightarrow 16a = 40 + 8 = 48$

$$\Rightarrow a = \frac{48}{16} = 3$$

92. (2) A : B = 5 : 4 = 45 : 36
B : C = 9 : 10 = 36 : 40
$\therefore$ A : B : C = 45 : 36 : 40
Sum of the terms of ratio
= 45 + 36 + 40 = 121

$$\therefore \text{ C's share} = \text{Rs.}\left(\frac{40}{121}\times2420\right)$$

= Rs. 800

93. (4) Successful students

$$\Rightarrow \frac{9}{11} \times 132 = 108$$

Unsuccessful students

$$\Rightarrow \frac{2}{11} \times 132 = 24$$

When 4 more students succeed,
Required ratio
= (108 + 4) : (24 − 4)
= 112 : 20 = 28 : 5

94. (3) Before battle,
Officers $\Rightarrow 3x$
Soldiers $\Rightarrow 31x$
According to the question,
After battle,

$$\frac{3x-6}{31x-22} = \frac{1}{13}$$

$\Rightarrow 39x - 78 = 31x - 22$
$\Rightarrow 39x - 31x = 78 - 22$
$\Rightarrow 8x = 56$

$$\Rightarrow x = \frac{56}{8} = 7$$

$\therefore$ Required number of officers
= 3 × 7 = 21

95. (2) Boys : Girls = 7 : 5

$$\text{Number of boys} = \frac{7}{12}\times720$$

= 420

$$\text{Number of girls} = \frac{5}{12}\times720$$

= 300
Let x girls be admitted.
According to the question,
$420 = 300 + x$
$\Rightarrow x = 420 - 300 = 120$

96. (3) Boys : Girls = 5 : 6
Sum of the terms of ratio
= 5 + 6 = 11
$\therefore$ Number of girls

$$= \frac{6}{11} \times 55 = 30$$

97. (2) Boys : Girls = 9 : 7,
Sum of the terms of the ratio = 9 + 7 = 16
Number of students = 256
$\therefore$ Number of girls

$$= \frac{256\times7}{16} = 112$$

98. (2) Let the numbers be x and y.
According to the question,
$x + y = 3(x - y)$
$\Rightarrow x + y = 3x - 3y$
$\Rightarrow 3x - x = y + 3y$
$\Rightarrow 2x = 4y$
$\Rightarrow x = 2y$

$$\Rightarrow \frac{x}{y} = \frac{2}{1}$$

99. (2) Reciprocal ratio

$$= \frac{yz}{x} : \frac{zx}{y} : \frac{xy}{z}$$

Their compound ratio

$$= \frac{yz.zx.xy}{xyz} = xyz : 1$$

100. (2) According to the question,

$$\frac{x+\frac{1}{x}}{x-\frac{1}{x}} = \frac{5}{3}$$

$\Rightarrow 5x - \frac{5}{x} = 3x + \frac{3}{x}$

$\Rightarrow 5x - 3x = \frac{5}{x} + \frac{3}{x}$

$\Rightarrow 2x = \frac{8}{x}$

$\Rightarrow x^2 = \frac{8}{2} = 4$

$\Rightarrow x = \sqrt{4} = \pm 2$

101. (2) Let the numbers be $3x$, $2x$ and $5x$.
According to the question,
$(3x)^2 + (2x)^2 + (5x)^2 = 1862$
$\Rightarrow 9x^2 + 4x^2 + 25x^2 = 1862$
$\Rightarrow 38x^2 = 1862$
$\Rightarrow x^2 = \frac{1862}{38} = 49 = 5 : 2$
$\therefore x = \sqrt{49} = 7$
$\therefore$ Number in the middle
$= 2x = 14$

102. (3) $2r = h + \sqrt{r^2 + h^2}$
$\Rightarrow 2r - h = \sqrt{r^2 + h^2}$
On squaring both sides,
$4r^2 + h^2 - 4rh = r^2 + h^2$
$\Rightarrow 3r^2 = 4rh$
$\Rightarrow 3r = 4h$
$\Rightarrow \frac{r}{h} = \frac{4}{3} = 4 : 3$

103. (2) Let the number of sweets be x.
A : B = 3 : 4
Sum of the terms of ratio
= 3 + 4 = 7
$\therefore$ A's share $= \frac{3x}{7}$
$\therefore \frac{3x}{7} = 36$
$\Rightarrow 3x = 36 \times 7$
$\Rightarrow x = \frac{36 \times 7}{3} = 84$

104. (2) In the college union,
Number of boys $= \frac{5}{8} \times 48 = 30$
Number of girls $= \frac{3}{8} \times 48 = 18$
Let the number of girls added be x.
$\therefore \frac{30}{18 + x} = \frac{6}{5}$
$\Rightarrow 108 + 6x = 150$
$\Rightarrow 6x = 150 - 108 = 42$
$\Rightarrow x = \frac{42}{6} = 7$

105. (3) In coloured picture,
Blue part $= \frac{4}{7}$
Yellow part $= \frac{3}{7}$
In upper half,
Blue part $= \frac{2}{5 \times 2} = \frac{1}{5}$
Yellow part $= \frac{3}{5 \times 2} = \frac{3}{10}$
In lower half,
Blue part $= \frac{4}{7} - \frac{1}{5} = \frac{20 - 7}{35}$
$= \frac{13}{35}$
Yellow part $= \frac{3}{7} - \frac{3}{10} = \frac{30 - 21}{70}$
$= \frac{9}{70}$
$\therefore$ Required ratio $= \frac{13}{35} : \frac{9}{70}$
= 26 : 9

TYPE-II

1. (2) Let the number to be added be z.
$\therefore \frac{x + z}{y + z} = \frac{p}{q}$
$\Rightarrow qx + zq = py + zp$
$\Rightarrow zp - zq = qx - py$
$\Rightarrow z(p - q) = qx - py$
$\Rightarrow z = \frac{qx - py}{p - q}$

2. (1) $\frac{x}{y} = \frac{3}{4}$
$\therefore \frac{4x - y}{2x + 3y} = \frac{4\frac{x}{y} - 1}{2\frac{x}{y} + 3}$
$= \frac{4 \times \frac{3}{4} - 1}{2 \times \frac{3}{4} + 3}$
$= \frac{2}{\frac{3}{2} + 3} = \frac{2 \times 2}{9} = 4 : 9$

3. (4) $x : y = 3 : 4 = 9 : 12$
$y : z = 3 : 4 = 12 : 16$
$\therefore x : y : z = 9 : 12 : 16$
$\therefore \frac{x + y + z}{3z} = \frac{9k + 12k + 16k}{3 \times 16k}$
$= \frac{37}{48}$

4. (3) A : B $= \frac{1}{2} : \frac{1}{3} = 3 : 2$
B : C $= \frac{1}{5} : \frac{1}{3} = 3 : 5$
$\frac{A}{B} = \frac{3}{2}$
$\Rightarrow \frac{A + B}{B} = \frac{3 + 2}{2} = \frac{5}{2}$
$\frac{B}{C} = 3 : 5 \Rightarrow \frac{C}{B} = \frac{5}{3}$
$\Rightarrow \frac{C + B}{B} = \frac{5}{3} + 1 = \frac{8}{3}$
$\therefore \frac{A + B}{C + B} = \frac{5}{2} \div \frac{8}{3}$
$= \frac{5}{2} \times \frac{3}{8} = \frac{15}{16} = 15 : 16$

5. (4) $\frac{x}{y} = \frac{3}{4}$ (Given)
$\therefore \frac{2x + 3y}{3y - 2x} = \frac{2\frac{x}{y} + \frac{3y}{y}}{\frac{3y}{y} - \frac{2x}{y}}$
(Dividing numerator and denominator by y)
$= \frac{2.\frac{x}{y} + 3}{3 - 2.\frac{x}{y}} = \frac{2 \times \frac{3}{4} + 3}{3 - 2 \times \frac{3}{4}}$
$= \frac{\frac{3}{2} + 3}{3 - \frac{3}{2}}$
$= \frac{3 + 6}{6 - 3} = \frac{9}{3} = 3 : 1$

6. (3) First number $= \frac{3x}{2}$ and second number $= \frac{8x}{3}$
According to the question,

$$\frac{\frac{3x}{2}+15}{\frac{8x}{3}+15} = \frac{\frac{5}{3}}{\frac{5}{2}}$$

$$\Rightarrow \frac{\frac{3x+30}{2}}{\frac{8x+45}{3}} = \frac{5}{3} \times \frac{2}{5} = \frac{2}{3}$$

$$\Rightarrow \frac{(3x+30)\times 3}{(8x+45)\times 2} = \frac{2}{3}$$

$\Rightarrow 32x + 180 = 27x + 270$

$\Rightarrow 32x - 27x = 270 - 180$

$\Rightarrow 5x = 90$

$$\Rightarrow x = \frac{90}{5} = 18$$

$$\therefore \text{ Larger number } = \frac{8x}{3}$$

$$= \frac{8\times 18}{3} = 48$$

7. (4) Ratio of division

$$= \frac{1}{2} : \frac{2}{3} : \frac{4}{5}$$

$$= \frac{1}{2}\times 30 : \frac{2}{3}\times 30 : \frac{4}{5}\times 30$$

[LCM of 2, 3 and 5 = 30]

$= 15 : 20 : 24$

$\therefore$ Sum of the terms of ratio

$= 15 + 20 + 24 = 59$

$\therefore$ Second part

$$= \text{Rs. } \left(\frac{20}{59}\times 177\right) = \text{Rs. } 60$$

8. (1) According to the question,

$$\frac{5A}{19} = \frac{2B}{5}$$

$$\Rightarrow 5A = \frac{19\times 2\,B}{5}$$

$$\Rightarrow A = \frac{38\times B}{5\times 5}$$

$\Rightarrow A : B = 38 : 25$

Sum of the terms of ratio

$= 38 + 25 = 63$

$$\Rightarrow \text{B's share} = \text{Rs. } \left(\frac{25}{63}\times 6300\right)$$

$= \text{Rs. } 2500$

9. (2) Let the required fraction be x.

According to the question,

$$x : \frac{1}{27} = \frac{3}{7} : \frac{5}{9}$$

$$\Rightarrow x \times \frac{5}{9} = \frac{1}{27}\times\frac{3}{7} = \frac{1}{63}$$

$$\Rightarrow x = \frac{1}{63}\times\frac{9}{5} = \frac{1}{35}$$

10. (2) $A : B : C = \frac{1}{2} : \frac{2}{3} : \frac{3}{4}$

$$= \left(\frac{1}{2}\times 12\right) : \left(\frac{2}{3}\times 12\right) : \left(\frac{3}{4}\times 12\right)$$

$= 6 : 8 : 9$

Sum of the terms of ratio

$= 6 + 8 + 9 = 23$

$\therefore$ First part

$$= \text{Rs. } \left(\frac{6}{23}\times 782\right)$$

$= \text{Rs. } 204$

11. (1) Ratio of the squares of $\frac{3}{2}$ and $\frac{4}{3}$

$$= \frac{9}{4} : \frac{16}{9}$$

Ratio of their reciprocals

$$= \frac{4}{9} : \frac{9}{16}$$

$= 64 : 81$

TYPE-III

1. (1) Let numbers = $5x$ and $4x$

$$\therefore 5x \times \frac{40}{100} = 12$$

$\Rightarrow 2x = 12 \Rightarrow x = 6$ and

Second number $= 6 \times 4 = 24$

$$\therefore 50\% \text{ of } 24 = 24 \times \frac{50}{100} = 12$$

2. (1) Milk : Water = K : 1

$\therefore$ S.P. = (K + 1) × 9

C.P. = 10K

Gain = 9 − K

$$\text{Gain \%} = \frac{9-K}{10K}\times 100$$

$$\Rightarrow \frac{9-K}{10K}\times 100 = 20$$

$\Rightarrow 90 - 10K = 20K$

$\Rightarrow 30K = 90 \Rightarrow K = 3$

$\therefore$ Ratio = 3 : 1

3. (2) Number of brown socks = x

Price of brown socks = ₹ y per pair

Price of black socks = ₹ $2y$ per pair

$\therefore 4y + x \times 2y$

$$= \frac{150}{100}(4\times 2y + xy)$$

$$\Rightarrow 4 + 2x = \frac{3}{2}(8 + x)$$

$\Rightarrow 8 + 4x = 24 + 3x$

$\Rightarrow x = 24 - 8 = 16$

$\therefore$ Required ratio = 4 : 16

$= 1 : 4$

4. (1) Number of boys = $8x$

Number of girls = $12x$

Students who do not get scholarships :

Boys $\Rightarrow 4x$

$$\text{Girls} \Rightarrow 12x \times \frac{75}{100} = 9x$$

Their sum $= 4x + 9x = 13x$

$\therefore$ Required percent

$$= \frac{13x}{20x}\times 100$$

$= 65\%$

5. (1) Gold : Copper = 3 : 2

Sum of the terms of ratio

$= 3 + 2 = 5$

$$\therefore \text{ Percentage of gold } = \frac{3}{5}\times 100$$

$= 60\%$

TYPE-IV

1. (2) Let their age be $3x$ and $2x$ years.

$\therefore 3x - 2x = 5$

$\Rightarrow x = 5$

$\therefore$ Younger student's age

$= 2x = 2 \times 5 = 10$ years

2. (3) Let the present age of brothers be x and $2x$ years.

Then, 5 years ago,

$$\frac{x-5}{2x-5} = \frac{1}{3}$$

$\Rightarrow 3x - 15 = 2x - 5$

$\Rightarrow x = 15 - 5 = 10$

$\therefore$ Age of elder brother

$= 10 \times 2 = 20$

$\therefore$ Required ratio

$$= \frac{10+5}{20+5} = \frac{15}{25} = 3:5$$

3. (1) 5 years ago, let the age of father = $2x$ years (let)
Then, Age of son = x years
$\therefore 2x + 5 + x + 5 = 100$
$\Rightarrow 3x = 100 - 10 = 90$

$$\Rightarrow x = \frac{90}{3} = 30$$

$\therefore$ Father's present age
$= 2x + 5 = 60 + 5 = 65$ years
Son's present age $= x + 5$
$= 30 + 5$
$= 35$ years.
After 10 years,

$$\text{Ratio} = \frac{65+10}{35+10} = \frac{75}{45} = \frac{5}{3} = 5 : 3$$

4. (1) Let the age of A and B four years ago be $11x$ and $14x$ years respectively.
According to the question,
After 4 years from now,

$$\frac{11x+8}{14x+8} = \frac{13}{16}$$

$\Rightarrow 176x + 128 = 182x + 104$
$\Rightarrow 182x - 176x = 128 - 104$

$$\Rightarrow 6x = 24 \Rightarrow x = \frac{24}{6} = 4$$

$\therefore$ A's present age $= (11x + 4)$ years
$= 11 \times 4 + 4 = 48$ years

5. (3) Let Maya's present age be $6x$ years and Chhaya's present age be $5x$ years.
After 15 years,

$$\frac{6x+15}{5x+15} = \frac{9}{8}$$

$\Rightarrow 48x + 120 = 45x + 135$
$\Rightarrow 48x - 45x = 135 - 120$
$\Rightarrow 3x = 15 \Rightarrow x = 5$
$\therefore$ Maya's present age $= 6x$
$= 6 \times 5 = 30$ years

6. (2) Let the age of Ram and Rahim 10 years ago be x and $3x$ years respectively.
After 5 years from now,

$$\frac{x+15}{3x+15} = \frac{2}{3}$$

$\Rightarrow 6x + 30 = 3x + 45$
$\Rightarrow 3x = 45 - 30 = 15$
$\Rightarrow x = 5$
$\therefore$ Ratio of their present age
$= (x + 10) : (3x + 10)$
$= 15 : 25 = 3 : 5$

7. (2) Let father's age be $5x$ years.
Son's age $= 2x$ years
$\therefore 5x \times 2x = 1000$
$\Rightarrow x^2 = 100 \Rightarrow x = 10$
$\therefore$ Father's age after 10 years
$= 5x + 10$
$= 5 \times 10 + 10 = 60$ years

8. (4) Sumit's present age
$= 2x$ years
Prakash's present age
$= 3x$ years
$\therefore 3x - 2x = 6$
$x = 6$
$\therefore$ Required ratio
$= (2 \times 6 + 6) : (3 \times 6 + 6)$
$= 18 : 24 = 3 : 4$

9. (1) Let x years ago the ratio of their age was 3 : 5
$\therefore$ According to the question

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

$\Rightarrow 200 - 5x = 180 - 3x$
$\Rightarrow 2x = 20$
$\therefore x = 10$ years

10. (3) Let the present age of two brothers be x and 2x years.

$$\text{Now, } \frac{x-5}{2x-5} = \frac{1}{3}$$

$\Rightarrow 3x - 15 = 2x - 5$
$\Rightarrow 3x - 2x = 15 - 5$
$\Rightarrow x = 10$
$\therefore$ Their present age
$= 10$ and 20 years
After 5 years their required ratio

$$= \frac{15}{25} = \frac{3}{5} = 3 : 5$$

11. (4) Four years ago let the age of A and B be 2x and 3x years respectively.
According to the question

$$\frac{2x+4+4}{3x+4+4} = \frac{5}{7}$$

$$\Rightarrow \frac{2x+8}{3x+8} = \frac{5}{7}$$

$\Rightarrow 14x + 56 = 15x + 40$
$\Rightarrow x = 16$
Present age of A $= 2x + 4$
$= 2 \times 16 + 4 = 36$ years
Present age of B
$= 3x + 4 = 3 \times 16 + 4$
$= 52$ years

12. (3) Boys in class $= \frac{4}{5} \times 50 = 40$

Girls $= \frac{1}{5} \times 50 = 10$

Average age of boys $= 10 \times 2$
$= 20$ years
$\therefore$ Total age of boys $= 20 \times 40$
$= 800$ years

13. (3) The present age of boys are $5x$ and $6x$ years respectively.
After 2 years,

$$\frac{5x+2}{6x+2} = \frac{7}{8} \Rightarrow 42x + 14 = 40x + 16$$

$\Rightarrow 2x = 2 \Rightarrow x = 1$
Ratio after 12 years
$\Rightarrow 5x + 12 : 6x + 12 = 17 : 18$

14. (2) Let the present age of Puneet and Appu be $2x$ and $3x$ years respectively.
After 3 years,

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

$\Rightarrow 9x + 9 = 8x + 12$
$\Rightarrow x = 3$
$\therefore$ Present age of Puneet
$= 2x = 2 \times 3 = 6$ years

15. (1) Let the age of father 10 years hence is $5x$ years, then age of son 10 years hence will be $3x$ years.
According to the question,

$$\frac{5x - 10 - 10}{3x - 10 - 10} = \frac{3}{1}$$

$$\Rightarrow \frac{5x - 20}{3x - 20} = \frac{3}{1}$$

$\Rightarrow 5x - 20 = 9x - 60$
$\Rightarrow 4x = 40$ or $x = 10$
$\therefore$ Required ratio
$= (3x - 10) : (5x - 10)$
$= 20 : 40 = 1 : 2$

16. (3) Let the present age of Rahul and Rashmi be $2x$ and x years respectively.
After 30 years,

$$\frac{2x+30}{x+30} = \frac{7}{6}$$

$\Rightarrow 12x + 180 = 7x + 210$
$\Rightarrow 12x - 7x = 210 - 180$

$$\Rightarrow 5x = 30 \Rightarrow x = \frac{30}{5} = 6$$

$\therefore$ Rahul's present age
$= 2x = 2 \times 6 = 12$ years

17. (2) Let the present age of A and B be $4x$ and $5x$ years respectively,
According to the question,

$$\frac{4x+5}{5x+5}=\frac{5}{6}$$

$\Rightarrow 25x + 25 = 24x + 30$
$\Rightarrow x = 30 - 25 = 5$
$\therefore$ A's present age
$= 4x = 4 \times 5 = 20$ years

18. (3) $\frac{36+n}{50+n}=\frac{3}{4}$

$\Rightarrow 144 + 4n = 150 + 3n$
$\Rightarrow 4n - 3n = 150 - 144$
$\Rightarrow n = 6$

19. (4) Sumit's present age
$= 2x$ years
Prakash's present age
$= 3x$ years
$\therefore 3x - 2x = 6$
$x = 6$
$\therefore$ Required ratio
$= (2 \times 6 + 6) : (3 \times 6 + 6)$
$= 18 : 24 = 3 : 4$

20. (1) Ages of the persons $= 4x$ and $7x$ years.
$\therefore 7x - 4x = 30 \Rightarrow 3x = 30$
$\Rightarrow x = 10$
$\therefore$ Sum of their ages $= 4x + 7x$
$= 11x$ years
$= 11 \times 10 = 110$ years

21. (4) 16 years ago,
My age $= x$ years
My grandfather's age $= 9x$ years
After 8 years from the present,
$9x + 16 + 8 = 3(x + 8 + 16)$
$\Rightarrow 9x + 24 = 3x + 24 + 48$
$\Rightarrow 9x + 24 = 3x + 72$
$\Rightarrow 9x - 3x = 72 - 24 \Rightarrow 6x = 48$

$\Rightarrow x = \frac{48}{6} = 8$

Required ratio 8 years ago,
$= (x + 8) : (9x + 8)$
$= (8 + 8) : (9 \times 8 + 8)$
$= 16 : 80 = 1 : 5$

22. (3) A's present age $= 3x$ years
B's present age $= x$ years
4 years ago,

$$\frac{3x-4}{x-4}=\frac{4}{1}$$

$\Rightarrow 4x - 16 = 3x - 4$
$\Rightarrow 4x - 3x = 16 - 4$
$\Rightarrow x = 12$
$\therefore$ A's present age
$= 3x = 3 \times 12 = 36$ years

23. (3) 18 years ago,
A's age $= 8x$ years
B's age $= 13x$ years
$\therefore$ At present,

$$\frac{8x+18}{13x+18}=\frac{5}{7}$$

$\Rightarrow 56x + 126 = 65x + 90$
$\Rightarrow 65x - 56x = 126 - 90$

$\Rightarrow 9x = 36 \Rightarrow x = \frac{36}{9} = 4$

$\therefore$ A's present age $= 8x + 18$
$= 8 \times 4 + 18 = 50$ years

24. (2) Age of first person $= 5x$ years
Age of second person
$= 9x$ years
According to the question,
$9x - 5x = 40 \Rightarrow 4x = 40$
$\Rightarrow x = 10$
$\therefore$ Sum of their ages
$= 5x + 9x = 14x$
$= 14 \times 10 = 140$ years

25. (3) Sonali's present age
$= 5x$ years
Monali's present age $= 3x$ years
According to the question,
After 5 years,

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

$$\Rightarrow \frac{x+1}{3x+5}=\frac{2}{7}$$

$\Rightarrow 7x + 7 = 6x + 10$
$\Rightarrow 7x - 6x = 10 - 7$
$\Rightarrow x = 3$
$\therefore$ Monali's present age $= 3x$
$= 9$ years

26. (2) 4 years ago,
P's age $= 5x$ years
Q's age $= 6x$ years
According to the question,
$5x + 4 + 6x + 4 = 52$
$\Rightarrow 11x = 52 - 8 = 44$

$\Rightarrow x = \frac{44}{11} = 4$

$\therefore$ Required ratio
$= (5x + 4) : (6x + 4)$
$= (5 \times 4 + 4) : (6 \times 4 + 4)$
$= 24 : 28 = 6 : 7$

27. (1) A's present age $= 5x$ years
B's present age $= 6x$ years
According to the question,
After 7 years,

$$\frac{5x+7}{6x+7}=\frac{6}{7}$$

$\Rightarrow 36x + 42 = 35x + 49$
$\Rightarrow 36x - 35x = 49 - 42$
$\Rightarrow x = 7$
A's present age $= 5x = 35$ years

28. (4) Let the ages of boys be $3x$ and $4x$ years respectively.
According to the question,
After 3 years

$$\frac{3x+3}{4x+3}=\frac{4}{5}$$

$\Rightarrow 16x + 12 = 15x + 15$
$\Rightarrow 16x - 15x = 15 - 12$
$\Rightarrow x = 3$
$\therefore$ Required ratio after 21 years

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

$$= \frac{3\times3+21}{4\times3+21}=\frac{9+21}{12+21}$$

$$= \frac{30}{33}=\frac{10}{11}$$

29. (4) A's present age
$= 4x$ years (let).
According to the question,
$4x + 6 = 26$
$\Rightarrow 4x = 26 - 6 = 20$

$\Rightarrow x = \frac{20}{4} = 5$

$\therefore$ B's present age $= 3x = 3 \times 5$
$= 15$ years

30. (1) A's present age $= 3x$ years (let)
B's present age $= 4x$ years
According to the question,
10 years ago,

$$\frac{3x-10}{4x-10}=\frac{4}{7}$$

$\Rightarrow 21x - 70 = 16x - 40$
$\Rightarrow 21x - 16x = 70 - 40$
$\Rightarrow 5x = 30$

$\Rightarrow x = \frac{30}{5} = 6$

$\therefore$ A's present age
$= 3x = 3x \times 6 = 18$ years
B's present age
$= 4x = 4 \times 6 = 24$ years

TYPE-V

1. (3) Let the numbers be 3x and 8x.

$\therefore$ 8x – 3x = 115

$\Rightarrow$ 5x = 115 $\Rightarrow$ x = $\frac{115}{5}$ = 23

$\therefore$ The smaller number

= 3x = 3 × 23 = 69

2. (2) x + 2x + 3x + 4x = 16

$\therefore$ x = $\frac{16}{10}$ = 1.6

$\therefore$ Sum = 1.6 + 6.4 = 8

3. (3) Let the two numbers be x and y.

$\therefore$ According to question,

x + y = 40 .....(i)

x – y = 4 ....(ii)

From equation (i) and (ii), we get

x = 22 and y = 18

$\therefore$ Required ratio

= $\frac{22}{18} = \frac{11}{9}$ = 11 : 9

4. (1) Let the nos. be 10x & 7 x

then, 10 x – 7x = 105

$\Rightarrow$ 3x = 105 $\Rightarrow$ x = 35

$\therefore$ Sum = 10x + 7x = 17x

= 17 × 35 = 595

5. (2) Let the integers be $9x$ and $7x$ respectively.

According to the question,

$9x \times 7x = 1575$

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

$\Rightarrow x^2 = 25$

$\Rightarrow x = 5$

[x being positive (+ve) integer]

$\therefore$ Smaller integer

$= 7x = 7 \times 5 = 35$

6. (3) Let the numbers be 3x, 2x and 5x respectively.

Now, $(3x)^2 + (2x)^2 + (5x)^2$

= 1862

$\Rightarrow 9x^2 + 4x^2 + 25x^2 = 1862$

$\Rightarrow 38x^2 = 1862$

$\Rightarrow x^2 = \frac{1862}{38} = 49$

$\Rightarrow$ x = $\sqrt{49}$ = 7

$\therefore$ The smallest number

= 2x = 2 × 7 = 14

7. (4)

Number	II		III		I
	9	:	16		
			4	:	1
	36	:	64	:	16
	9	:	16	:	4

Therefore, second number

= $\frac{9}{9+16+4} \times 116 = \frac{9}{29} \times 116$

= 36

8. (3) Let the numbers be x, y and z. Then

$x : y = 2 : 3$; $y : z = 5 : 8$

$\therefore x : y : z = 2 \times 5 : 3 \times 5 : 3 \times 8$

= 10 : 15 : 24

Sum of the ratios

= 10 + 15 + 24 = 49

$\therefore$ The second number

= $\frac{15}{49} \times 98 = 30$

9. (4) Quantity of milk in 45 litres

= $\frac{2}{3} \times 45$ = 30 litres.

$\therefore$ Water = (45 – 15)

= 15 litres

Let x litres of water be added.

$\therefore \frac{30}{15+x} = \frac{1}{2}$

$\Rightarrow 15 + x = 60$

$\Rightarrow x = 60 - 15 = 45$ litres.

10. (1) Let the numbers be a, b and c.

Now, $a : b = 8 : 9$

$b : c = 3 : 4$

$\therefore a : b : c$

$= 8 \times 3 : 9 \times 3 : 9 \times 4$

= 24 : 27 : 36 = 8 : 9 : 12

$\therefore \frac{a}{8} = \frac{b}{9} = \frac{c}{12} = k$

$\Rightarrow a = 8k$, $b = 9k$, $c = 12k$

According to the question,

$8k \times 12k = 2400$

$\Rightarrow k^2 = \frac{2400}{8 \times 12} = 25$

$\Rightarrow k = 5$

$\therefore$ Second number

$= 9k = 9 \times 5 = 45$

11. (1) Let the number be $2x$ and $3x$. Then.

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

$\Rightarrow 4x - 4 = 3x + 2$

$\Rightarrow x = 6$

$\therefore$ Sum of numbers = $5x$

$= 5 \times 6 = 30$

12. (4) Ratio of numbers

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

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

= 6 : 8 : 9

Let the numbers be $6x$, $8x$ and $9x$.

Now, $9x - 6x = 36$

$\Rightarrow x = 12$

$\therefore$ Numbers are

72, 96 and 108.

13. (1) Let the numbers be a, b and c. Then

$a : b = 2 : 3$

b : c = 5 : 3

$\therefore a : b : c = 2 \times 5 : 3 \times 5 : 3 \times 3$

= 10 : 15 : 9

Let the numbers now be $10x$, $15x$ and $9x$

$\therefore 10x + 15x + 9x = 68$

$\Rightarrow 34x = 68 \Rightarrow x = \frac{68}{34} = 2$

$\therefore$ Second number = 15 x

= 15 × 2 = 30

14. (3) Let the number to be subtracted be x.

According to the question,

$\frac{7-x}{9-x} = \frac{11-x}{15-x}$

Now, check through options

Clearly, putting $x = 3$,

Each ratio = $\frac{2}{3}$.

Note : Solve such questions orally by mental exercise.

Aliter : Using Rule 32,

The number will be x

= $\frac{ad - bc}{(a+d)-(b+c)}$

= $\frac{7 \times 15 - 9 \times 11}{(7+15)-(9+11)}$

= $\frac{105-99}{22-20}$

= $\frac{6}{2}$ = 3

15. (2) Let the numbers be $2x$ and $3x$.

$\therefore 2x \times 3x = 96$

$\Rightarrow x^2 = \frac{96}{6} = 16$

$\therefore x = \sqrt{16} = 4$

$\therefore$ Sum = $2x + 3x = 5x$

$= 5 \times 4 = 20$

16. (3) Let the numbers be $3x$ and $4x$.

$\therefore \frac{3x+6}{4x+6} = \frac{4}{5}$

$\Rightarrow 16x + 24 = 15x + 30$

$\Rightarrow x = 30 - 24 = 6$

$\therefore$ Required difference = 6

Aliter : Using Rule 34,

Here, a = 3, b= 4, x = 6

c = 4, d = 5

The numbers are $= \frac{xa(c-d)}{ad-bc}$

$= \frac{6.3(4-5)}{3\times5-4\times4}$

$= \frac{18\times-1}{15-16} = 18$

$= \frac{xb(c-d)}{ad-bc}$

$= \frac{6\times4(4-5)}{3\times5-4\times4}$

$= \frac{24\times(-1)}{15-16} = 24$

Numbers are 24 and 18.

Their difference = 24 – 18 = 6

17. (4) Let the two numbers are x and y.

According to the question,

$\frac{x}{y} = \frac{5}{7}$

7x = 5y

7x – 5y = 0 ...(I)

Again, $\frac{x-40}{y-40} = \frac{17}{27}$

$\Rightarrow$ 27x – 1080 = 17y – 680

$\Rightarrow$ 27x – 17y = 1080 – 680

$\Rightarrow$ 27x – 17y = 400 ...(II)

From (I) × 17 – (II) × 5, we have

119x – 85y = 0

135x – 85y = 2000

– + –

– 16x = – 2000

$\therefore$ x = 125

Putting the value of x in equation (I)

7 × 125 = 5y

$\therefore y = \frac{7\times125}{5} = 175$

$\therefore$ Difference of the numbers = 175 – 125 = 50

Aliter : Using Rule 35,

Here, a = 5, b = 7, x = 40

c = 17, d = 27

The two numbers are

$= \frac{xa(d-c)}{ad-bc}$

$= \frac{40\times5(27-17)}{5\times27-7\times17}$

$= \frac{200\times10}{135-119}$

$= \frac{2000}{16} = \frac{500}{4}$

1st Number = 125

And $= \frac{xb(d-c)}{ad-bc}$

$= \frac{40\times7(27-17)}{5\times27-7\times17}$

$= \frac{280\times10}{135-119}$

$= \frac{2800}{16} = \frac{700}{4}$

2nd Number = 175

Their difference= 175 – 125 = 50

18. (3) Let the numbers be $5x$, $6x$ and $7x$ respectively.

$\therefore 5x \times 6x \times 7x = 5670$

$\Rightarrow x^3 = \frac{5670}{5\times6\times7} = 27$

$\therefore x = \sqrt[3]{27} = 3$

$\therefore$ The greatest number = $7x$

= 7 × 3 = 21

19. (1) Let the numbers be $3x$ and x,

Then, $3x + x = 240$

$\Rightarrow 4x = 240$

$\Rightarrow x = \frac{240}{4} = 60$

$\therefore$ Difference = $3x - x = 2x$

= 2 × 60 = 120

20. (3) $x + y = 3(x - y)$

$\Rightarrow x + y = 3x - 3y \Rightarrow 2x = 4y$

$\Rightarrow \frac{x}{y} = \frac{2}{1} \Rightarrow x : y = 2 : 1$

21. (3) Let the numbers be $3x$, $4x$ and $5x$.

$\therefore 5x + 3x = 4x + 52$

$\Rightarrow 4x = 52 \Rightarrow x = 13$

$\therefore$ The smallest number

$= 3x = 3 \times 13 = 39$

22. (4) Let required number be x.

$\therefore \frac{6+x}{7+x} = \frac{15+x}{17+x}$

$\Rightarrow 102 + 17x + 6x + x^2$

$= 105 + 7x + 15x + x^2$

$\Rightarrow 23x - 22x = 105 - 102$

$\Rightarrow x = 3$

Note : It is convenient to solve it orally using options

$\frac{6+3}{7+3} = \frac{15+3}{17+3} \Rightarrow \frac{9}{10} = \frac{18}{20}$

Aliter : Using Rule 32,

Required Number

$= \frac{bc-ad}{(a+d)-(b+c)}$

Where a = 6, b = 7, c

= 15, d = 17

$= \frac{7\times15-6\times17}{(6+17)-(7+15)}$

$= \frac{105-102}{23-22} = 3$

23. (2) $\frac{6+x}{14+x} = \frac{18+x}{38+x}$

From the given alternatives

$\frac{6+2}{14+2} = \frac{18+2}{38+2}$

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

Aliter : Using Rule 32,

Here, a = 6, b = 14, c

= 18, d = 38

Required number x

$= \frac{bc-ad}{(a+d)-(b+c)}$

$= \frac{14\times18-6\times38}{(6+38)-(14+18)}$

$= \frac{252-228}{44-32} = \frac{24}{12} = 2$

24. (1) A : B = 8 : 9
B : C = 3 : 4 = 9 : 12
$\therefore$ A : B : C = 8 : 9 : 12
$\therefore$ Numbers = $8x$, $9x$ and $12x$
$\therefore 8x \times 12x = 2400$

$$\Rightarrow x^2 = \frac{2400}{8 \times 12} = 25$$

$$\therefore x = \sqrt{25} = 5$$

$\therefore$ A + B + C = $8x + 9x + 12x$
$= 29x$
$= 29 \times 5 = 145$

25. (3) Check through options
Number = 36
3 + 6 = 9; 6 – 3 = 3
and 36 : 9 = 4 : 1
Otherwise– $10x + y : x + y = 4 : 1$
$\Rightarrow 10x + (x + 3) : x + (x + 3) = 4 : 1$

$$\Rightarrow \frac{11x+3}{2x+3} = \frac{4}{1}$$

$\Rightarrow 11x + 3 = 8x + 12$
$\Rightarrow 3x = 9 \Rightarrow x = 3$ and $y = 6$
Then the number is 36.

26. (2) Number of balls in bag x and y respectively = $2a$ and $3a$
$\therefore 3a - 5 = 2a + 3$
$\Rightarrow a = 5 + 3 = 8$
$\therefore$ Total number of balls
$= 5a = 40$
$\therefore$ Balls in each bag = 20

27. (3) $(x + y)^2 = 4xy$
$\Rightarrow x^2 + y^2 + 2xy - 4xy = 0$

$$\Rightarrow (x - y)^2 = 0 \Rightarrow x = y$$

$\Rightarrow x : y = 1 : 1$

28. (2) Numbers = $2x$, $3x$ and $4x$
$\therefore (2x)^2 + (3x)^2 + (4x)^2 = 1856$
$\Rightarrow 4x^2 + 9x^2 + 16x^2 = 1856$
$\Rightarrow 29x^2 = 1856$
$\Rightarrow x^2 = 1856 \div 29 = 64$
$\therefore x = \sqrt{64} = 8$
$\therefore$ Numbers = 16, 24 and 32

29. (3) From the given options number = 5, because

$$\frac{7+5}{16+5} = \frac{43+5}{79+5}$$

$$\Rightarrow \frac{12}{21} = \frac{48}{84}$$

[check other options likewise]
Aliter : Using Rule 32,
Here, a = 7, b=16, c = 43, d= 79
Required number x

$$= \frac{bc - ad}{(a+d)-(b+c)}$$

$$= \frac{16 \times 43 - 7 \times 79}{(7+79)-(16+43)}$$

$$= \frac{688-553}{86-79} = \frac{35}{7} = 5$$

30. (4) Average of two no's = 62
$\therefore$ Sum of the numbers
$= 62 \times 2 = 124$
Sum of the numbers = 124
If the larger number be x, then smaller number = $124 - x$

$$\therefore \frac{124 - x + 2}{x} = \frac{1}{2}$$

$\Rightarrow 252 - 2x = x$
$\Rightarrow 3x = 252 \Rightarrow x = 84$
$\therefore$ Smaller number
$= 124 - 84 = 40$
$\therefore$ Difference = 84 – 40 = 44

31. (4) Let x be subtracted from each term of $\frac{15}{19}$.

$$\therefore \frac{15-x}{19-x} = \frac{3}{4}$$

$\Rightarrow 57 - 3x = 60 - 4x$
$\Rightarrow x = 3$

32. (1) Numbers are x and y
$\therefore x + y = 25$
$x - y = 20$
On adding,
$2x = 45$

$$\Rightarrow x = \frac{45}{2} = 22.5$$

From equation (i),
$22.5 + y = 25$
$\Rightarrow y = 25 - 22.5 = 2.5$
$\therefore$ Required ratio = 22.5 : 2.5
= 9 : 1

33. (1) $\therefore$ Ratio of numbers = 2 : 3
Sum of ratios = 2 + 3 = 5

$$\therefore \text{First number} = \frac{2}{5} \times 125 = 50$$

$$\text{Second number} = \frac{3}{5} \times 125 = 75$$

34. (3) Numbers = $2x$, $3x$ and $5x$,
According to question,
$(2x)^2 + (3x)^2 + (5x)^2 = 608$
$\Rightarrow 4x^2 + 9x^2 + 25x^2 = 608$
$\Rightarrow 38x^2 = 608$

$$\Rightarrow x^2 = \frac{608}{38} = 16$$

$\Rightarrow x = \sqrt{16} = 4$
$\therefore$ Numbers $\Rightarrow 2x = 2 \times 4 = 8$
$3x = 3 \times 4 = 12$
$5x = 5 \times 4 = 20$

35. (1) Numbers = $7x$ and $9x$ (let)
According to the question,
$7x \times 9x = 1575$

$$\Rightarrow x^2 = \frac{1575}{7 \times 9} = 25$$

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

$\therefore$ Larger number = $9x$
$= 9 \times 5 = 45$

36. (2) Let A = $4x$ and B = $5x$.
According to the question,
$(5x)^2 - (4x)^2 = 81$
$\Rightarrow 25x^2 - 16x^2 = 81$
$\Rightarrow 9x^2 = 81 \Rightarrow x^2 = 9$

$$\Rightarrow x = \sqrt{9} = 3$$

$\therefore$ A = $4x = 4 \times 3 = 12$

37. (3) Let the numbers be $2x$ and $3x$ respectively.
According to the question,

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

$\Rightarrow 9x + 24 = 8x + 32$
$\Rightarrow 9x - 8x = 32 - 24 = 8$
$\Rightarrow x = 8$
$\therefore$ Sum of numbers = $2x + 3x$
$= 5x$
$= 5 \times 8 = 40$
Aliter : Using Rule 34,
Here, a = 2, b = 3, x= 8, c = 3, d = 4

$$\text{1st Number} = \frac{xa(c-d)}{ad-bc}$$

$$= \frac{8 \times 2(3-4)}{2 \times 4 - 3 \times 3}$$

$$= \frac{-16}{-1} = 16$$

$$\text{2nd Number} = \frac{xb(c-d)}{ad-bc}$$

$$= \frac{8 \times 3(3-4)}{2 \times 4 - 3 \times 3}$$

$$= \frac{-24}{-1} = 24$$

Sum of numbers = 16 + 24 = 40

38. (1) Numbers = $5x$ and $8x$

According to the question,

$8x - 5x = 48$

$\Rightarrow 3x = 48 \Rightarrow x = 16$

$\therefore$ Smaller number = $5x$

$= 5 \times 16 = 80$

39. (2) Let the numbers be $5x$, $7x$ and $12x$.

According to the question,

$5x + 12x = 7x + 50$

$\Rightarrow 17x - 7x = 50$

$\Rightarrow 10x = 50$

$\Rightarrow x = \frac{50}{10} = 5$

$\therefore$ Required sum

$= 5x + 7x + 12x = 24x$

$= 24 \times 5 = 120$

40. (4) According to the question,

The number 84 must be a multiple of sum of the terms of ratio.

For ratio 3 : 2,

Sum of the terms of ratio

= 3 + 2 = 5 which is not a factor of 84.

41. (4) Let the numbers be $3x$ and $5x$.

According to the question,

$$\frac{3x+6}{5x+6} = \frac{2}{3}$$

$\Rightarrow 10x + 12 = 9x + 18$

$\Rightarrow 10x - 9x = 18 - 12$

$\Rightarrow x = 6$

Numbers are :

$3x = 3 \times 6 = 18$ and

$5x = 5 \times 6 = 30$

42. (1) Let three numbers be a, b and c respectively.

According to the question,

$a + b + c = 540$

and $b : c = 9 : 13$

$a : c = 2 : 7$

$$\therefore \frac{a}{c} \times \frac{c}{b} = \frac{2}{7} \times \frac{13}{9}$$

$$\Rightarrow \frac{a}{b} = \frac{26}{63}$$

$\therefore b : c = 9 : 13 = 63 : 91$

$\therefore a : b : c = 26 : 63 : 91$

Sum of the terms of ratio

= 26 + 63 + 91 = 180

$$\therefore c = \frac{91}{180} \times 540 = 273$$

TYPE-VI

1. (3) Let the numbers be $4x$ and $5x$.

Their LCM = $20x$

According to the question,

$20x = 180$

$$\Rightarrow x = \frac{180}{20} = 9$$

$\therefore$ Smaller number

$= 4x = 4 \times 9 = 36$

2. (4) If the numbers be $3x$ and $4x$, then their LCM = $12x$

$$\therefore 12x = 180 \Rightarrow x = \frac{180}{12} = 15$$

$\therefore$ First number = $3x = 45$

3. (1) Let the numbers be $3x$ and $5x$.

$\therefore$ LCM = $15x$

$$\therefore 15x = 225 \Rightarrow x = \frac{225}{15} = 15$$

$\therefore$ Smaller number

$= 3x = 3 \times 15 = 45$

4. (2) Let the numbers be $3x$ and $4x$.

$\therefore$ LCM = $12x$

$\therefore 12x = 48 \Rightarrow x = 4$

$\therefore$ Sum of numbers = $7x$

$= 7 \times 4 = 28$

5. (3) Numbers are : $3x$ and $4x$

Their LCM = $12x$

$\therefore 12x = 120$

$$\Rightarrow x = \frac{120}{12} = 10$$

$\therefore$ Sum of numbers = $3x + 4x$

$= 7x = 7 \times 10 = 70$

6. (1) Let the numbers be $3x$ and $4x$.

Their HCF = $x = 15$

$\therefore$ Sum of numbers = $3x + 4x =$

$7x = 15 \times 7 = 105$

TYPE-VII

1. (3) Let A and B have ₹ 2x and ₹ x initially.

$\therefore 2x - 2 = x + 2$

$\Rightarrow x = 4$

$\therefore$ Initial amount with A = ₹ 8

$\therefore$ Initial amount with B = ₹ 4.

2. (1) Total numbers of girls in the school

$$= 504 \times \frac{11}{13+11}$$

$$= 504 \times \frac{11}{24} = 231$$

Total numbers of boys in the school

$$= 504 \times \frac{13}{13+11}$$

$$= 504 \times \frac{13}{29} = 273$$

Now, total no. of girls when 12 more girls are admitted

= 231 + 12 = 243

$\therefore$ Required ratio

= 273 : 243 = 91 : 81

3. (3) Let the numbers be $\frac{3}{2}x$ and $\frac{8}{3}x$

According to question,

$$\frac{\frac{3}{2}x + 15}{\frac{8x}{3} + 15} = \frac{\frac{5}{3}}{\frac{5}{2}}$$

$$\Rightarrow \frac{\frac{3x+30}{2}}{\frac{8x+45}{3}} = \frac{2}{3}$$

$$\Rightarrow \frac{3(3x+30)}{2(8x+45)} = \frac{2}{3}$$

$$\Rightarrow \frac{9x+90}{16x+90} = \frac{2}{3}$$

$\Rightarrow 27x + 270 = 32x + 180$

$\Rightarrow 32x - 27x = 270 - 180 = 90$

$\Rightarrow 5x = 90 \Rightarrow x = 18$

$\therefore$ The greater number

$$= \frac{8}{3}x = \frac{8}{3} \times 18 = 48$$

4. (3) Let the number of students in three classes be 2x, 3x and 5x respectively.

Due to increase of 40 students in each class, we have

$$\frac{2x+40}{3x+40} = \frac{4}{5}$$

$\Rightarrow 10x + 200 = 12x + 160$

$\Rightarrow 2x = 200 - 160 \Rightarrow 2x = 40$

$\Rightarrow x = 20$

$\therefore$ Original strength

$= 10x = 10 \times 20 = 200$

5. (2) Let the numbers be 5x and 7x.

Now, $\frac{5x-9}{7x-9} = \frac{7}{11}$

$\Rightarrow 11(5x - 9) = 7(7x - 9)$

$\Rightarrow 55x - 99 = 49x - 63$

$\Rightarrow 55x - 49x = 99 - 63$
$\Rightarrow 6x = 36$
$\Rightarrow x = 6$
$\therefore$ Required difference
$= 7x - 5x = 2x = 2 \times 6 = 12$

Aliter : Using Rule 35,
Here, a = 5, b = 7,
x = 9, c = 7, d = 11

$$\text{1st Number} = \frac{xa(d-c)}{ad-bc}$$

$$= \frac{9\times5(11-7)}{5\times11-7\times7}$$

$$= \frac{45\times4}{55-49}$$

$$= \frac{45\times4}{6} = 30$$

$$\text{2nd Number} = \frac{xb(d-c)}{ad-bc}$$

$$= \frac{9\times7(11-7)}{5\times11-7\times7}$$

$$= \frac{63\times4}{55-49}$$

$$= \frac{63\times4}{6} = 42$$

Their difference = 42 – 30 = 12

6. (2) Let the numbers be $3x$ and $5x$.

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

$\Rightarrow 69x - 60x = 207 - 108$

$$\Rightarrow x = \frac{99}{9} = 11$$

$\therefore$ The smaller number
$= 3x = 33$

Aliter : Using Rule 35,
Here, a = 3, b = 5, x= 9, c = 12, d = 23

$$\text{1st Number} = \frac{xa(d-c)}{ad-bc}$$

$$= \frac{9\times3(23-12)}{3\times23-5\times12}$$

$$= \frac{27\times11}{69-60}$$

$$\frac{27\times11}{9} = 33$$

$$\text{2nd Number} = \frac{xb(d-c)}{ad-bc}$$

$$= \frac{9\times5(23-12)}{3\times23-5\times12}$$

$$= \frac{45\times11}{69-60}$$

$$= \frac{45\times11}{9} = 55$$

$\therefore$ Smallest number = 33

7. (3) Let the original number of boys and girls be x and y respectively.
Then

$$\frac{x}{y-15} = \frac{2}{1}$$

$\Rightarrow x = 2y - 30$ ....(i)

Again, $\frac{x-45}{y-15} = \frac{1}{5}$

$\Rightarrow 5x - 225 = y - 15$
$\Rightarrow 5x = y - 15 + 225$
$\Rightarrow 5\ (2y-30) = y + 210$ [From equation (i)]
$\Rightarrow 10y - 150 = y + 210$
$\Rightarrow 10y - y = 210 + 150$
$\Rightarrow 9y = 360$

$$\Rightarrow y = \frac{360}{9} = 40$$

8. (3) Let the original number of students in three classes be $2x$, $3x$ and $5x$ respectively.
As given,

$$\frac{2x+20}{3x+20} = \frac{4}{5}$$

$\Rightarrow 10x + 100 = 12x + 80$
$\Rightarrow 12x - 10x = 100 - 80$
$\Rightarrow 2x = 20$

$$\Rightarrow x = \frac{20}{2} = 10$$

$\therefore$ Total number of students originally
$= 2x + 3x + 5x = 10x$
$= 10 \times 10 = 100$

9. (1) Using Rule 21,
Number of boys

$$= \frac{13}{13+11}\times504$$

$$= \frac{13}{24}\times504 = 273$$

Number of girls
= 504–273 = 231
3 girls are admitted.
$\therefore$ Required ratio = 273 : 234
= 7 : 6

10. (3) Let the number of ladies and gents be $3x$ and $2x$ respectively.
According to the question,

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

$\Rightarrow 9x = 4x + 40 \Rightarrow 5x = 40$
$\Rightarrow x = 8$
$\therefore$ Number of ladies = $3x$
$= 3 \times 8 = 24$

11. (4) Using Rule 21,
Initially number of boys

$$= \frac{8}{8+5}\times286 = \frac{8}{13}\times286 = 176$$

$\therefore$ Number of girls

$$= \frac{5}{13}\times286 = 110$$

22 more girls get admitted.
$\therefore$ Required ratio

$$= \frac{176}{110+22} = \frac{176}{132} = \frac{4}{3} = 4:3$$

12. (1) Let the original number of students be $2x$, $3x$ and $4x$ in three class.
According to the question,

$$\frac{2x+12}{3x+12} = \frac{8}{11}$$

$\Rightarrow 24x + 96 = 22x + 132$
$\Rightarrow 2x = 132 - 96 = 36$

$$\Rightarrow x = \frac{36}{2} = 18$$

$\therefore$ Original number of students
$= 2x + 3x + 4x$
$= 9x = 9 \times 18 = 162$

13. (4) Let the required number be x.

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

$\Rightarrow 28 + 4x = 33 + 3x$
$\Rightarrow x = 33 - 28 = 5$

14. (2) Let the numbers be $7x$ and $11x$ respectively.

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

$\therefore 22x + 14 = 21x + 21$
$\Rightarrow x = 7$
$\therefore$ Smaller number
$= 7x = 7 \times 7 = 49$

Aliter : Using Rule 34,
Here, a = 7, b = 11,
x = 7, c= 2, d = 3

1st Number $= \frac{xa(c-d)}{ad-bc}$

$= \frac{7 \times 7(2-3)}{7 \times 3 - 11 \times 2}$

$= \frac{49 \times -1}{21-22} = 49$

2nd Number $= \frac{xb(c-d)}{ad-bc}$

$= \frac{7 \times 11(2-3)}{7 \times 3 - 11 \times 2}$

$= \frac{77 \times -1}{21-22} = 77$

$\therefore$ Smallest number = 49

15. (3) Let the numbers be $3x$ and $5x$.

$\therefore \frac{3x+10}{5x+10} = \frac{5}{7}$

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

$\Rightarrow 4x = 20$

$\Rightarrow x = 5$

$\therefore$ Smaller number = $3x$

$= 3 \times 5 = 15$

Aliter : Using Rule 34,

Here, a = 3, b = 5, c = 5, d = 7, x = 10

$\therefore$ Smallest number

$= \frac{xa(c-d)}{ad-bc}$ $\because$ a < b

$= \frac{10 \times 3(5-7)}{3 \times 7 - 5 \times 5}$

$= \frac{-60}{21-25}$

$= \frac{60}{4} = 15$

16. (1) Let the numbers be $2x$ and $3x$.

$\therefore \frac{2x+4}{3x+4} = \frac{5}{7}$

$\therefore 15x + 20 = 14x + 28$

$\Rightarrow x = 28 - 20 = 8$

= Required difference

Aliter : Using Rule 34,

Here, a = 2, b = 3, c = 5, d = 7 and x = 4

1st Number $= \frac{xa(c-d)}{ad-bc}$

$= \frac{4 \times 2(5-7)}{2 \times 7 - 5 \times 3}$

$= \frac{8 \times -2}{14-15} = 16$

2nd Number $= \frac{xb(c-d)}{ad-bc}$

$= \frac{4 \times 3(5-7)}{2 \times 7 - 5 \times 3}$

$= \frac{4 \times 3(-2)}{14-15} = 24$

Difference of numbers

= 24 – 16 = 8

17. (4) Let the number x be added.

$\therefore \frac{17+x}{24+x} = \frac{1}{2}$

$\Rightarrow 34 + 2x = 24 + x$

$\Rightarrow 2x - x = 24 - 34$

$\Rightarrow x = -10$

Hence, 10 should be subtracted.

18. (3) Let the numbers be $4x$ and $7x$.

$\therefore \frac{4x+4}{7x+4} = \frac{3}{5}$

$\Rightarrow 21x + 12 = 20x + 20$

$\Rightarrow 21x - 20x = 20 - 12$

$\Rightarrow x = 8$

$\therefore$ Larger number

$= 7x = 7 \times 8 = 56$

Aliter : Using Rule 34,

a = 4, b = 7, c = 3, d = 5, x = 4

Larger number $= \frac{xb(c-d)}{ad-bc}$

$= \frac{4 \times 7(3-5)}{4 \times 5 - 3 \times 7}$

$= \frac{4 \times 7 \times (-2)}{20-21} = 56$

19. (2) Let the original number of students be $4x$, $6x$ and $9x$.

$\therefore \frac{4x+12}{6x+12} = \frac{7}{9}$

$\Rightarrow 42x + 84 = 36x + 108$

$\Rightarrow 42x - 36x = 108 - 84$

$\Rightarrow 6x = 24$

$\Rightarrow x = 4$

$\therefore$ Required number of students

$= 19x = 19 \times 4 = 76$

20. (3) In the first case,

Boys $= 660 \times \frac{13}{22} = 390$

Girls $= 660 \times \frac{9}{22} = 270$

If x boys leave the school, then

$\frac{390-x}{270+30} = \frac{6}{5}$

$\Rightarrow 390 - x = 360$

$\Rightarrow x = 390 - 360 = 30$

21. (1) Tricky Approach

Required ratio

= 15 × 22 : 11 × 25 = 6 : 5

22. (3) According to the question,

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

(Numbers = $3x$ and $5x$)

$\Rightarrow 69x - 207 = 60x - 108$

$\Rightarrow 9x = 207 - 108 = 99$

$\Rightarrow x = 11$

$\therefore$ Required numbers $\Rightarrow 3 \times 11 = 33$ and $5 \times 11 = 55$

Aliter : Using Rule 35,

Here, a = 3, b = 5,

c = 12, d = 23, x = 9

1st Number $= \frac{xa(d-c)}{ad-bc}$

$= \frac{9 \times 3(23-12)}{3 \times 23 - 5 \times 12}$

$= \frac{27 \times 11}{69-60}$

$= \frac{27 \times 11}{9} = 33$

2nd Number $= \frac{xb(d-c)}{ad-bc}$

$= \frac{9 \times 5(23-12)}{3 \times 23 - 5 \times 12}$

$= \frac{45 \times 11}{69-60}$

$= \frac{45 \times 11}{9} = 55$

Numbers are 33, 55

23. (4) Numbers = x, $2x$ and $3x$

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

$\Rightarrow 4x + 10 = 3x + 15$

$\Rightarrow x = 5$

$\Rightarrow$ Numbers = 5, 10 and 15

24. (1) Marks in English = $2x$

Marks in Maths = $3x$

Marks in Science = x

$\therefore x + 2x + 3x = 180$

$\Rightarrow 6x = 180 \Rightarrow x = 30$

25. (2) Required number = x

$\therefore \frac{11-x}{15-x} = \frac{2}{3}$

$\Rightarrow 33 - 3x = 30 - 2x$

$\Rightarrow 3x - 2x = 33 - 30$

$\Rightarrow x = 3$

26. (2) Numbers = $3x$ and $5x$ (let)

According to question,

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

$\Rightarrow 69x - 207 = 60x - 108$

$\Rightarrow 69x - 60x = 207 - 108$

$\Rightarrow 9x = 99 \Rightarrow x = \frac{99}{9} = 11$

$\therefore$ Smaller number $= 3x$

$= 3 \times 11 = 33$

27. (4) According to the question,

Sum of remaining two numbers

$= 11 \times 36 - 9 \times 34$

$= 396 - 306 = 90$

Ratio of the remaining two numbers = 2 : 3

$\therefore$ Smaller number

$= \frac{2}{5} \times 90 = 36$

28. (3) Original number of boys in school $= \frac{5}{9} \times 432 = 240$

Number of girls = 432 – 240 = 192

Let the new number of girls be x.

According to the question,

$\frac{240+12}{192+x} = \frac{7}{6}$

$\Rightarrow \frac{252}{192+x} = \frac{7}{6}$

$\Rightarrow 192 \times 7 + 7x = 252 \times 6$

$\Rightarrow 1344 + 7x = 1512$

$\Rightarrow 7x = 1512 - 1344 = 168$

$\Rightarrow x = \frac{168}{7} = 24$

29. (3) Let the numbers be x and $5x$.

According to the question,

$x \times 5x = 320$

$\Rightarrow 5x^2 = 320$

$\Rightarrow x^2 = \frac{320}{5} = 64$

$\Rightarrow x = \sqrt{64} = 8$

$\therefore$ Required difference

$= (5x)^2 - x^2$

$= 25x^2 - x^2 = 24x^2$

$= 24 \times 8 \times 8 = 1536$

30. (1) Let two positive numbers be $3x$ and $4x$.

According to the question,

$(3x)^2 + (4x)^2 = 400$

$\Rightarrow 9x^2 + 16x^2 = 400$

$\Rightarrow 25x^2 = 400$

$\Rightarrow x^2 = \frac{400}{25} = 16$

$\Rightarrow x = \sqrt{16} = 4$

$\therefore$ Sum of numbers

$= 3x + 4x = 7x$

$= 7 \times 4 = 28$

31. (2) Let the numbers be x, $2x$ and $3x$.

According to the question,

$x^3 + (2x)^3 + (3x)^3 = 4500$

$\Rightarrow x^3 + 8x^3 + 27x^3 = 4500$

$\Rightarrow 36x^3 = 4500$

$\Rightarrow x^3 = \frac{4500}{36} = 125$

$\therefore x = \sqrt[3]{125}$

$= 5$ = smallest number

TYPE-VIII

1. (1) Weight of zinc

$= 200 \times \frac{5}{8} = 125$ gram

Weight of copper

$= 200 \times \frac{3}{8} = 75$ gram.

Let the ratio of 125 gram zinc and x gram copper be 3 : 5

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

$\therefore x = \frac{125 \times 5}{3} = \frac{625}{3}$ gram

$\therefore$ Addition of copper in mixture

$= \frac{625}{3} - 75 = \frac{625-225}{3}$

$= \frac{400}{3} = 133\frac{1}{3}$ gram.

2. (3) $\because$ In 20 gm of brass, quantity of zinc = 7gm

$\therefore$ In 100 gm of brass, quantity of zinc = $7 \times 5 = 35$ gm.

3. (4) In 30 litres of mixture,

Acid $= \frac{2}{5} \times 30 = 12$ litres

Water $= \frac{3}{5} \times 100 = 18$ litres

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

$\Rightarrow 60 = 36 + 2x$

$\Rightarrow 2x = 60 - 36 = 24$

$\Rightarrow x = 12$ litres of water.

4. (1) Weight of copper in 17kg 500 gm i.e. 17500 gm of alloy

$= \frac{5}{7} \times 17500 = 12500$ gm

Weight of zinc = (17500 – 12500) = 5000 gm

1250 gm of zinc is mixed in alloy.

$\therefore$ Total weight of zinc

= 1250 + 5000 = 6250 gm.

$\therefore$ Required ratio

= 12500 : 6250 = 2 : 1

5. (1) In the new vessel, we have.

Sulphuric acid

$= \frac{3}{5} + \frac{7}{10} + \frac{11}{15}$

$= \frac{18+21+22}{30} = \frac{61}{30}$

Water $= \frac{2}{5} + \frac{3}{10} + \frac{4}{15}$

$= \frac{12+9+8}{30} = \frac{29}{30}$

$\therefore$ Sulphuric acid : Water

$= \frac{61}{30} : \frac{29}{30} = 61 : 29$

6. (2) Let the quantity of additional milk added = x litres

In the mixture of 200 litres,

Quantity of milk $= \frac{17}{20} \times 200$

= 170 litres

Quantity of water = 30 litres
According to the question,

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

$\Rightarrow$ 170 + x = 210
$\Rightarrow$ x = 210 – 170
= 40 litres

7. (3) Let A = $7x$ litre, B = $5x$ litre
In 9 litres of mixture,

$$A = \frac{7x}{12x}\times 9 = \frac{21}{4} \text{ litres}$$

$$B = \frac{5x}{12x}\times 9 = \frac{15}{4} \text{ litres}$$

In new situation,

$$\frac{7x-\frac{21}{4}}{5x-\frac{15}{4}+9}=\frac{7}{9}$$

$$\Rightarrow \frac{28x-21}{20x-15+36}=\frac{7}{9}$$

$\Rightarrow$ 252x – 189 = 140x + 147
$\Rightarrow$ 112x = 336 $\Rightarrow$ x = 3
$\therefore$ Initial quantity of liquid A
= $7x$ = 7 × 3 = 21 litres

8. (3) Let Liquid A = $7x$ litres
Liquid B = $5x$ litres
In 9 litres,

$$A = \frac{7}{12}\times 9 = \frac{21}{4} \text{ litres}$$

$$B = \frac{5}{12}\times 9 = \frac{15}{4} \text{ litres}$$

$$\therefore\ 7x-\frac{21}{4}=5x-\frac{15}{4}+9$$

$$\Rightarrow 2x=\frac{21}{4}-\frac{15}{4}+9$$

$$\Rightarrow 2x=\frac{21-15+36}{4}=\frac{42}{4}$$

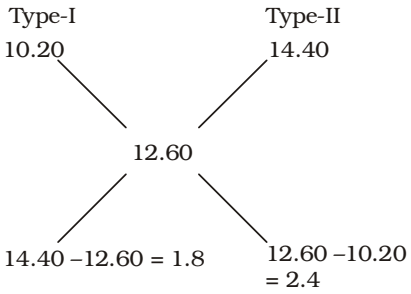
$$\Rightarrow x=\frac{21}{4}$$

$$\therefore \text{Liquid A} = 7\times\frac{21}{4}$$

$$=\frac{147}{4}=36\frac{3}{4} \text{ litre}$$

9. (1) Gold = $\frac{7}{9}:\frac{7}{18}=\frac{14}{18}:\frac{7}{18}$
$\therefore$ Gold in new mixture
= 14 + 7 = 21
and copper = 18 × 2 – 21
= 36 – 21 = 15
$\therefore$ Required ratio
= 21 : 15 = 7 : 5

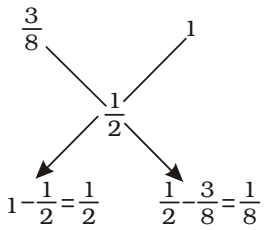
10. (4)



$\therefore$ Required ratio = 1.8 : 2.4
= 18 : 24 = 3 : 4

11. (4) Let the amount of water be x litres.
Then, $\frac{x+3}{x}=\frac{3}{2}$
or 2x + 6 = 3x
or x = 6
$\therefore$ The quantity of spirit in the mixture = x + 3 = 6 + 3 = 9 litres

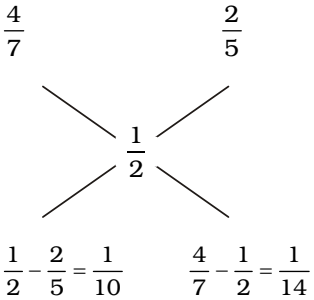
12. (3)



Ratio = 4 : 1

$\therefore$ Required quantity = $\frac{1}{5}$

13. (1)
Mixture -I Mixture – II



$\therefore$ Required ratio

$$=\frac{1}{10}:\frac{1}{14}=7:5$$

14. (3) Amount of milk left
= Initial amount ×

$$\left(1-\frac{\text{Amount taken out in each operation}}{\text{Initial amount}}\right)^3$$

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

$$=60\left(1-\frac{1}{10}\right)^3$$

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

= 43.74 kg.

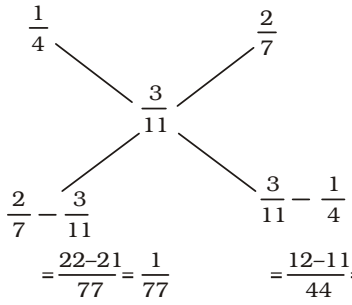
15. (2) Required ratio

$$=\left(\frac{2}{3}+\frac{3}{5}+\frac{5}{8}\right):\left(\frac{1}{3}+\frac{2}{5}+\frac{3}{8}\right)$$

$$=\left(\frac{80+72+75}{120}\right):\left(\frac{40+48+45}{120}\right)$$

= 227 : 133

16. (2) By rule of alligation,
Alloy-I (copper) Alloy-II (Copper)



Required ratio

$$=\frac{1}{77}:\frac{1}{44}=4:7$$

17. (4) In original mixture,
Alcohol = $4x$ litres
Water = $3x$ litres
On adding 5 litres of water,

$$\frac{4x}{3x+5}=\frac{4}{5}$$

$\Rightarrow$ 20x = 12x + 20
$\Rightarrow$ 8x = 20

$$\Rightarrow x=\frac{20}{8}=\frac{5}{2}$$

$\Rightarrow$ Quantity of alcohol

$$=4x=4\times\frac{5}{2}$$

= 10 litres

18. (4) In 7 kg of alloy A,
Zinc = 5 kg, Tin = 2 kg
In 21 kg of alloy B

$$\text{Zinc} = \frac{21\times 3}{7} = 9 \text{ kg}$$

$$\text{Tin} = \frac{21\times 4}{7} = 12 \text{ kg}$$

$\therefore$ Required ratio
= (5 + 9) : (2 + 12) = 14 : 14
or 1 : 1

19. (1) In 400 gm of alloy,

$$\text{Zinc} = \frac{5}{8}\times 400 = 250 \text{ gm.}$$

$$\text{Copper} = \frac{3}{8}\times 400 = 150 \text{ gm.}$$

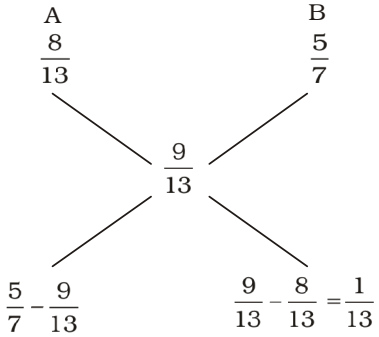
If x gm of copper be mixed, then

$$\frac{250}{150+x} = \frac{5}{4}$$

$\Rightarrow 750 + 5x = 1000$
$\Rightarrow 5x = 1000 - 750 = 250$
$\Rightarrow x = 50$ gm.

20. (4) Milk in the resulting mixture

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



$$= \frac{65-63}{7\times 13} = \frac{2}{7\times 13}$$

$\therefore$ Required ratio

$$= \frac{2}{7\times 13} : \frac{1}{13}$$

= 2 : 7

21. (1) Quantity of milk in 30 litre mixture $= \frac{30}{10}\times 7 = 21$ litres

Quantity of water

$$= \frac{30}{10}\times 3 = 9 \text{ litres}$$

Suppose x litres more water is added.

According to question,

$$\frac{21}{9+x} = \frac{3}{7}$$

$\Rightarrow 9 + x = 49$
$\Rightarrow x = 40$ litres

22. (2) Let the barrel contain 4 litres of mixture.
$\therefore$ Wine = 3 litres
Water = 1 litre
Let x litre mixture is taken out.
$\therefore$ Wine in $(4 - x)$ litres mixture

$$= \frac{3}{4}(4-x)$$

On adding x litres water, water in mixture

$$= (4-x)\times\frac{1}{4} + x$$

$$= 1 - \frac{x}{4} + x$$

$$= \frac{4-x+4x}{4} = \frac{4+3x}{4}$$

$$\therefore \frac{3}{4}(4-x) = \frac{4+3x}{4}$$

$$\Rightarrow 3 - \frac{3x}{4} = 1 + \frac{3x}{4}$$

$$\Rightarrow 2 = \frac{6x}{4}$$

$$\Rightarrow x = \frac{2\times 4}{6} = \frac{4}{3}$$

$\therefore$ Required answer

$$= \frac{\frac{4}{3}}{4} = \frac{1}{3}$$

23. (4) Quantity of milk in the last

$$= 81\left(1-\frac{27}{81}\right)^2 = 81\left(1-\frac{1}{3}\right)^2$$

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

Quantity of water in the last
= 81 − 36 = 45

$$\therefore \text{Ratio} = \frac{36}{45} = \frac{4}{5} = 4:5$$

24. (4) Quantity of milk

$$= \frac{7}{10}\times 80 = 56 \text{ litres}$$

Quantity of water

$$= \frac{3}{10}\times 80 = 24 \text{ litres}$$

Let x litre water be added

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

$\Rightarrow 24 + x = 28$

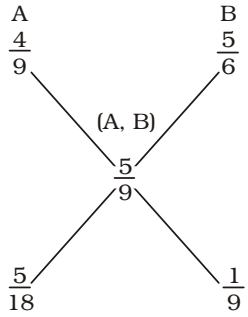
$x = 4$ litres

25. (3) First of all we write the fraction of milk present in three mixtures.

In A; $\frac{4}{9}$ and In B; $\frac{5}{6}$

In combination of A and B; $\frac{5}{9}$

From alligation rule,



$$= \frac{5}{18} : \frac{1}{9}$$

$$\Rightarrow \frac{5}{18} : \frac{2}{18} \Rightarrow 5:2$$

So, ratio of
A : B = 5 : 2

26. (2) Let the quantity of milk in the mixture = $7x$ litres and that of water = $5x$ litres.
According to the question,

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

$\Rightarrow 56x = 35x + 105$
$\Rightarrow 56x - 35x = 105$
$\Rightarrow 21x = 105$

$$\Rightarrow x = \frac{105}{21} = 5$$

$\therefore$ Required quantity of water
= (5x + 15) litres
= 5 × 5 + 15 = 40 litres

27. (1) Quantity of milk in 729 litres of mixture

$$= \frac{7}{9}\times 729 = 567 \text{ litres}$$

$\therefore$ Quantity of water
= (729 − 567) litres = 162 litres.

Let x litres of water is mixed to get the required ratio of 7 : 3

$\therefore \frac{567}{162+x} = \frac{7}{3}$

$\Rightarrow 7x + 1134 = 1701$

$\Rightarrow 7x = 1701 - 1134 = 567$

$\Rightarrow x = \frac{567}{7} = 81$ litres

28. (3) In 40 litres mixture,

Quantity of milk

$= \frac{7}{8} \times 40 = 35$ litres

Quantity of water = 5 litres

Let x litres of water be mixed

$\therefore \frac{35}{5+x} = \frac{3}{1}$

$\Rightarrow 3x + 15 = 35$

$\Rightarrow 3x = 20$

$\Rightarrow x = \frac{20}{3} = 6\frac{2}{3}$ litres

29. (4) Let the initial quantity of liquids A and B in the jar be $4x$ and x litres respectively.

After taking out 10 litres of the mixture,

Liquid A

$= 4x - \frac{4}{5} \times 10 = (4x - 8)$ litres

Liquid B

$= 4x - \frac{1}{5} \times 10 = (4x - 2)$ litres

After pouring 10 litres of liquid B,

$\frac{4x-8}{4x-2+10} = \frac{2}{3}$

$\Rightarrow 12x - 24 = 8x + 16$

$\Rightarrow 4x = 40$

$\Rightarrow x = \frac{40}{4} = 10$

$\therefore$ Quantity of liquid A = $4x$

= 4 × 10 = 40 litres

30. (3) In 75 litres of the mixture,

Milk = $\frac{2}{3} \times 75 =$ 50 litres

Water = $\frac{1}{3} \times 75 = 25$ litres

Let x litres of water be added. Then,

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

$\Rightarrow x + 25 = 100$

$\Rightarrow x = 75$ litres

31. (3) Let 1 kg of each of the alloys A and B be mixed together.

In alloy A,

Quantity of gold= $\frac{5}{8}$ kg.

Quantity of copper= $\frac{3}{8}$ kg.

In alloy B,

Quantity of gold = $\frac{5}{16}$ kg.

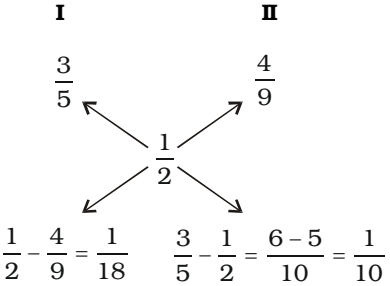
Quantity of copper = $\frac{11}{16}$ kg.

$\therefore$ Required ratio

$= \left(\frac{5}{8} + \frac{5}{16}\right) : \left(\frac{3}{8} + \frac{11}{16}\right)$

$= \frac{15}{16} : \frac{17}{16} = 15 : 17$

32. (1) By the rule of alligation,



$\frac{1}{2} - \frac{4}{9} = \frac{1}{18}$ $\quad$ $\frac{3}{5} - \frac{1}{2} = \frac{6-5}{10} = \frac{1}{10}$

$\therefore$ Required ratio = $\frac{1}{18} : \frac{1}{10} = 5:9$

$= 3 : \frac{9}{5} \times 3 = 3 : 5\frac{2}{5}$

$\therefore 5\frac{2}{5}$ litre must be added

33. (2) In the original mixture,

water = 60 cc

Glycerine = 180 cc

Let x cc of water be mixed.

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

$\Rightarrow 180 + 3x = 360$

$\Rightarrow 3x = 360 - 180 = 180$

$\therefore x = \frac{180}{3} = 60$ cc

34. (4) Let the quantity of acid in original mixture be x litre and that of water be $3x$ litres.

$\therefore \frac{x+5}{3x} = \frac{1}{2}$

$\Rightarrow 2x + 10 = 3x$

$\Rightarrow x = 10$

$\therefore$ Quantity of new mixture

$= 4x + 5 = 45$ litres

35. (1) In 25 litres of mixture,

Acid = $\frac{4}{5} \times 25 = 20$ litres

Water = 5 litres.

After adding 3 litres of water, quantity becomes 8 litres

$\therefore$ New ratio = 20 : 8 = 5 : 2

36. (4) Let the capacity of each vessel =1 litre

In First Vessel

Water = $\frac{3}{7}$ litre

Milk = $\frac{4}{7}$ litre

In Second Vessel

Water = $\frac{5}{8}$ litre

Milk = $\frac{3}{8}$ litre

In 2 litres of mixture,

Water : milk

$= \frac{3}{7} + \frac{5}{8} : \frac{4}{7} + \frac{3}{8}$

$= \frac{24+35}{56} : \frac{32+21}{56} = 59 : 53$

37. (1) Quantity of gold in 1 kg of alloy 'A' = $\frac{7}{29}$

Quantity of gold in 1kg of alloy 'B'

$= \frac{21}{58}$

Quantity of gold in 1 kg of alloy 'C' = $\frac{25}{87}$

$\therefore$ Required ratio

$= \left(\frac{21}{58} - \frac{25}{87}\right) : \left(\frac{25}{87} - \frac{7}{29}\right)$

$= \frac{63-50}{174} : \frac{25-21}{87}$

$= \frac{13}{174} : \frac{4}{87} = 13 : 8$

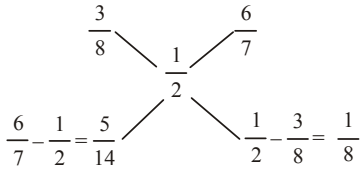
38. (1) In glass I

Milk = $\frac{3}{8}$, water = $\frac{5}{8}$

In glass II,

Milk = $\frac{6}{7}$, water = $\frac{1}{7}$

By Alligation rule,



$\therefore$ Required ratio

$= \frac{5}{14} : \frac{1}{8} = 20 : 7$

39. (4) In original mixture,
Milk = 40 litres
Water = 20 litres
If x litres of water is mixed,

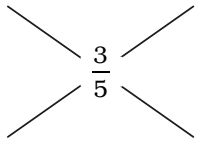
$\frac{40}{20+x} = \frac{1}{2}$

$\Rightarrow 20 + x = 80 \Rightarrow x = 60$ litres

40. (2) By alligation rule

Mixture -I Mixture – II

Acid = $\frac{4}{7}$ Acid = $\frac{5}{8}$



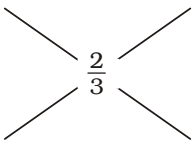
$\frac{5}{8} - \frac{3}{5} = \frac{1}{40}$ $\frac{3}{5} - \frac{4}{7} = \frac{1}{35}$

$\therefore$ Required ratio

$= \frac{1}{40} : \frac{1}{35} = 7 : 8$

41.(1) Solution -I Solution - II

Acid = $\frac{3}{4}$ Acid $\frac{5}{8}$



$\frac{2}{3} - \frac{5}{8}$ $\frac{3}{4} - \frac{2}{3}$

$= \frac{16-15}{24} = \frac{1}{24}$ $= \frac{9-8}{12} = \frac{1}{12}$

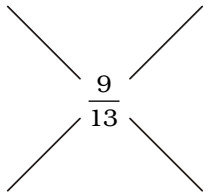
$\therefore$ Required ratio

$= \frac{1}{24} : \frac{1}{12} = 1 : 2$

42. (2) By alligation rule,

Mixture-I Mixture-II

Acid = $\frac{5}{7}$ Acid = $\frac{8}{13}$



$\frac{5}{7} - \frac{9}{13}$ $\frac{9}{13} - \frac{8}{13} = \frac{1}{13}$

$= \frac{65-63}{91} = \frac{2}{91}$

$\therefore$ Required ratio

$= \frac{2}{91} : \frac{1}{13} = 2 : 7$

43. (3) In 20 litres of mixture,

Spirit = $\frac{3}{10} \times 20 = 6$ litres,

Water = 14 litres

In 36 litres of mixture

Spirit = $\frac{7}{12} \times 36 = 21$ litres

Water = 15 litres

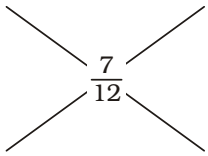
$\therefore$ Required ratio

= (21 + 6) : (14 + 15) = 27 : 29

44. (2) By Alligation Rule

Mixture-I Mixture II

Alcohol = $\frac{5}{8}$ Alcohol = $\frac{5}{9}$



$\frac{7}{12} - \frac{5}{9}$ $\frac{5}{8} - \frac{7}{12}$

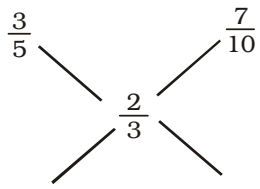
$= \frac{21-20}{36}$ $= \frac{15-14}{24}$

$= \frac{1}{36}$ $= \frac{1}{24}$

$\therefore$ Ratio = $\frac{1}{36} : \frac{1}{24} = 3 : 2$

45. (2) By Alligation Rule

Milk-I Milk-II



$\frac{7}{10} - \frac{2}{3}$ $\frac{2}{3} - \frac{3}{5} = \frac{1}{15}$

$= \frac{21-20}{30}$ $= \frac{10-9}{15}$

$= \frac{1}{30}$ $= \frac{1}{15}$

$\therefore$ Required ratio = $\frac{1}{30} : \frac{1}{15}$

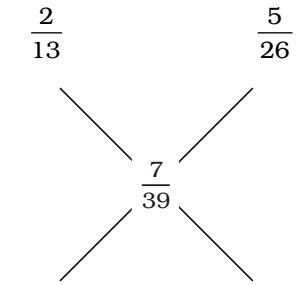
= 1 : 2

46. (3) By Alligation Rule

Stainless Steel I II III

Chromium $\frac{2}{13}$ $\frac{5}{26}$ $\frac{7}{39}$

By Alligation Rule,



$\frac{5}{26} - \frac{7}{39}$ $\frac{7}{39} - \frac{2}{13}$

$= \frac{15-14}{78} = \frac{1}{78}$ $= \frac{7-6}{39} = \frac{1}{39}$

$\therefore$ Required ratio = 1 : 2

47. (4) 1 kg of each mixture is taken.

A $\Rightarrow$ 7 : 2 = 14 : 4

Gold = $\frac{14}{18}$; Copper = $\frac{4}{18}$

B $\Rightarrow$ 7 : 11

Gold = $\frac{7}{18}$; Copper = $\frac{11}{18}$

$\therefore$ Required ratio

$= \left(\frac{14}{18} + \frac{7}{18}\right) : \left(\frac{4}{18} + \frac{11}{18}\right)$

= 21 : 15 = 7 : 5

48. (3) Let the original quantity be $12x$ litres.

In 9 litres of the mixture,

Liquid A $= \frac{7}{12} \times 9 = \frac{21}{4}$ litres

Liquid B $= \frac{5}{12} \times 9 = \frac{15}{4}$ litres

According to question,

$$\frac{7x - \frac{21}{4}}{5x - \frac{15}{4} + 9} = \frac{7}{9}$$

$$\Rightarrow \frac{28x - 21}{20x - 15 + 36} = \frac{7}{9}$$

$$\Rightarrow \frac{28x - 21}{20x + 21} = \frac{7}{9}$$

$$\Rightarrow \frac{4x - 3}{20x + 21} = \frac{1}{9}$$

$\Rightarrow 36x - 27 = 20x + 21$

$\Rightarrow 36x - 20x = 21 + 27$

$\Rightarrow 16x = 48$

$\Rightarrow x = 3$

Original quantity of liquid A

$= 7x = 7 \times 3 = 21$ litres

49. (3) Milk in first vessel

$= \frac{5}{8} = 0.625$

Milk in second vessel

$= \frac{2}{3} = 0.66$

Milk in third vessel $= \frac{3}{5} = 0.6$

Milk in fourth vessel

$= \frac{7}{11} = 0.636$

50. (2) Let x kg of nickel be mixed.

$\therefore \frac{20 + x}{100 + x} = \frac{3}{11}$

$\Rightarrow 220 + 11x = 300 + 3x$

$\Rightarrow 11x - 3x = 300 - 220$

$\Rightarrow 8x = 80$

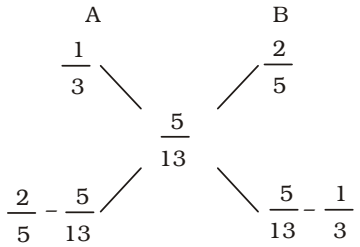
$\Rightarrow x = 10$ kg.

51. (1) In first alloy, zinc $= \frac{1}{3}$

In second alloy, zinc $= \frac{2}{5}$

In the new alloy, zinc $= \frac{5}{13}$

By the rule of Alligation,



$\therefore$ Required ratio

$= \left(\frac{2}{5} - \frac{5}{13}\right) : \left(\frac{5}{13} - \frac{1}{3}\right)$

$= \frac{26 - 25}{65} : \frac{15 - 13}{39}$

$= \frac{1}{65} : \frac{2}{39} = \frac{1}{5} : \frac{2}{3} = 3 : 10$

52. (4) Let x litres of liquid P be mixed to 7 litres of liquid Q.

According to the question,

$$x \times \frac{10}{7} + \frac{5}{7} \times 7 = x + 7$$

$$\Rightarrow \frac{10x}{7} + 5 = x + 7$$

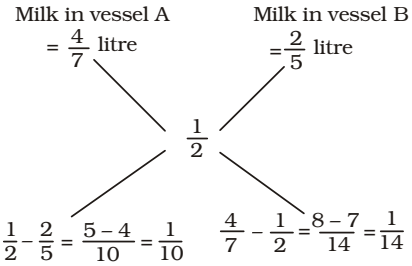
$\Rightarrow 10x + 35 = 7x + 49$

$\Rightarrow 10x - 7x = 49 - 35$

$\Rightarrow 3x = 14$

$\Rightarrow x = \frac{14}{3} = 4\frac{2}{3}$ litres

53. (1) By the rule of alligation,



$\therefore$ Required ratio $= \frac{1}{10} : \frac{1}{14}$

$= 14 : 10 = 7 : 5$

54. (4) Capacity of each container

$= x$ litre (let)

In first container,

Milk $= \frac{3x}{4}$ litres,

Water $= \frac{x}{4}$ litres

In second container,

Milk $= \frac{5x}{7}$ litres,

Water $= \frac{2x}{7}$ litres

On mixing both,

Quantity of milk $= \frac{3x}{4} + \frac{5x}{7}$

$= \frac{21x + 20x}{28} = \frac{41x}{28}$ litres

Quantity of water $= \frac{x}{4} + \frac{2x}{7}$

$= \frac{7x + 8x}{28}$ litres $= \frac{15x}{28}$ litres

$\therefore$ Required ratio

$= \frac{41x}{28} : \frac{15x}{28} = 41 : 15$

55. (4) Let the volume of each glass be $= x$ litres.

$\therefore$ Required ratio

= Alcohal : water

$= \left(\frac{2x}{3} + \frac{3x}{5}\right) : \left(\frac{x}{3} + \frac{2x}{5}\right)$

$= \left(\frac{10x + 9x}{15}\right) : \left(\frac{5x + 6x}{15}\right)$

$= 19 : 11$

56. (4) Quantity of remaining acid

= Initial quantitiy

$$\left(1 - \frac{\text{Quantity taken out}}{\text{Total initial quantity}}\right)^n$$

$= 10\left(1 - \frac{2}{10}\right)^2 = 10 \times \left(\frac{4}{5}\right)^2$

$= 10 \times \frac{4}{5} \times \frac{4}{5} = \frac{32}{5}$ litres

Required ratio $= \frac{32}{5} : 10$

$= 32 : 50$

$= 16 : 25$

57. (4) G = 19W and C = 9W

Let 1 gm of gold is mixed with x gm of copper such that $(x + 1)$ gm of alloy is formed.

$\therefore 19W + 9Wx = (x + 1) \times 15W$

$\Rightarrow 19 + 9x = 15x + 15$

$\Rightarrow 15x - 9x = 19 - 15 \Rightarrow 6x = 4$

$\Rightarrow x = \frac{2}{3}$

$\therefore$ Gold : Copper $= 1 : \frac{2}{3}$

$= 3 : 2$

58. (2) In 80 litres of mixture,
Milk : Water = 27 : 5

$\therefore$ Milk $\Rightarrow \frac{27}{32} \times 80$

= 67.5 litres

Water $\Rightarrow$ 80 – 67.5

= 12.5 litres

Let x litres of water is mixed.

According to question,

$$\frac{67.5}{12.5 + x} = \frac{3}{1}$$

$\Rightarrow 37.5 + 3x = 67.5$

$\Rightarrow 3x = 67.5 - 37.5 = 30$

$\Rightarrow x = 10$ litres

59. (3) By the rule of alligation

liquid I In mixture I, liquid I In mixture II,

$\frac{3}{8}$ $\frac{6}{7}$

$\frac{7}{10}$

$\frac{6}{7} - \frac{7}{10}$ $\frac{7}{10} - \frac{3}{8}$

$= \frac{60 - 49}{70} = \frac{11}{70}$ $= \frac{28 - 15}{40} = \frac{13}{40}$

$\therefore$ Required ratio $= \frac{11}{70} : \frac{13}{4}$

$= 11 \times 4 : 13 \times 7$

$= 44 : 91$

60. (3) Remaining acid

= Initial quantity

$$\left(1 - \frac{\text{quantity taken out}}{\text{Original quantity}}\right)$$

$= 20 \left(1 - \frac{4}{20}\right)^2$

$= 20 \left(1 - \frac{1}{5}\right)^2$

$= 20 \times \frac{4}{5} \times \frac{4}{5}$

= 12. 8 litres

$\therefore$ Required ratio = 12.8 : 20

= 128 : 200 = 16 : 25

61. (1) By the rule of alligation,

Mixture I Darjeeling tea Mixture II Darjeeling tea

$\frac{4}{11}$ $\frac{2}{7}$

$\frac{6}{19}$

$\frac{6}{19} - \frac{2}{7}$ $\frac{4}{11} - \frac{6}{19}$

$= \frac{42 - 38}{19 \times 7}$ $= \frac{76 - 66}{11 \times 19}$

$= \frac{4}{19 \times 7}$ $= \frac{10}{11 \times 19}$

$\therefore$ Required ratio

$= \frac{4}{19 \times 7} : \frac{10}{11 \times 19}$

$= \frac{4}{7} : \frac{10}{11}$

= 44 : 70 = 22 : 35

62. (2) Let quantity of first variety of tea = $4x$ kg.

Quantity of second variety of tea = $5x$ kg.

Quantity of third variety of tea = $8x$ kg.

Let y kg of third variety of tea be mixed.

$\therefore$ Resultant ratio = $(4x + 5) : (5x + 10) : (8x + y)$

$\therefore \frac{4x + 5}{5x + 10} = \frac{5}{7}$

$\Rightarrow 28x + 35 = 25x + 50$

$\Rightarrow 28x - 25x = 50 - 35$

$\Rightarrow 3x = 15 \Rightarrow x = \frac{15}{3} = 5$

$\therefore \frac{5x + 10}{8x + y} = \frac{7}{9}$

$\Rightarrow \frac{5 \times 5 + 10}{8 \times 5 + y} = \frac{7}{9}$

$\Rightarrow \frac{35}{40 + y} = \frac{7}{9}$

$\Rightarrow 40 + y = 9 \times 5$

$\Rightarrow y = 45 - 40 = 5$ kg.

$\therefore$ Required quantity of third variety of tea

$= 8x + y = 8 \times 5 + 5 = 45$ kg.

63. (4) Let there be 3 litres, 2 litres and 1 litre of mixtures in three vessels respectively.

Vessel I

In 1 litre of mixture,

Milk = $\frac{5}{7}$ litre, water = $\frac{2}{7}$ litre

Vessel II

In 1 litre of mixture,

Milk = $\frac{4}{5}$ litre, water = $\frac{1}{5}$ litre

Vessel III

In $\frac{1}{7}$ litre of mixture,

Milk = $\frac{4}{5} \times \frac{1}{7} = \frac{4}{35}$ litre

Water = $\frac{1}{35}$ litre

In new vessel,

Mixture = $1 + 1 + \frac{1}{7}$

$= 2 + \frac{1}{7} = \frac{14 + 1}{7} = \frac{15}{7}$ litres

Water = $\frac{2}{7} + \frac{1}{5} + \frac{1}{35}$

$= \frac{10 + 7 + 1}{35} = \frac{18}{35}$ litre

Required percentage

$= \frac{\frac{18}{35}}{\frac{15}{7}} \times 100$

$= \frac{18}{35} \times \frac{7}{15} \times 100 = 24\%$

64. (1) In 729 ml of mixture,

$$\text{Milk} = \frac{7}{9} \times 729 = 567 \text{ ml}$$

$$\text{Water} = \frac{2}{9} \times 729 = 162 \text{ ml.}$$

Let x ml of water be mixed.

$$\therefore \frac{567}{162+x} = \frac{7}{3}$$

$\Rightarrow 162 \times 7 + 7x = 567 \times 3$

$\Rightarrow 1134 + 7x = 1701$

$\Rightarrow 7x = 1701 - 1134 = 567$

$$\Rightarrow x = \frac{567}{7} = 81 \text{ ml.}$$

65. (2) Let 3kg of first alloy and 4 kg of second alloy be mixed together.

$\therefore$ In 3 kg of mixture,

Tin = 1 kg.

Iron = 2 kg.

In 4 kg of mixture,

$$\text{Tin} = \frac{2}{5} \times 4 = \frac{8}{5} = 1.6 \text{ kg.}$$

$$\text{Iron} = \frac{3}{5} \times 4 = \frac{12}{5} = 2.4 \text{ kg.}$$

$\therefore$ Required ratio

= (1 + 1.6) : (2 + 2.4) = 2.6 : 4.4

= 13 : 22

66. (2) Let each vessel contain 1 litre of mixture.

$\therefore$ Total quantity of milk

$$= \frac{6}{7} + \frac{5}{7} + \frac{3}{4}$$

$$= \frac{24+20+21}{28} = \frac{65}{28} \text{ litre}$$

Total quantity of water

$$= \frac{1}{7} + \frac{2}{7} + \frac{1}{4}$$

$$= \frac{4+8+7}{28} = \frac{19}{28} \text{ litre}$$

$$\therefore \text{Required ratio} = \frac{65}{28} : \frac{19}{28}$$

= 65 : 19

67. (2) In 60 kg of alloy A,

$$\text{Lead} = \frac{3}{5} \times 60 = 36 \text{ kg.}$$

$$\text{Tin} = \frac{2}{5} \times 60 = 24 \text{ kg.}$$

In 100 kg of alloy B,

$$\text{Tin} = \frac{1}{5} \times 100 = 20 \text{ kg.}$$

In 160 kg of new alloy,

Tin = 24 + 20 = 44 kg.

68. (2) Let the capacity of each glass be 1 litre.

On mixing all three mixtures together,

$$\text{Acid} \Rightarrow \frac{2}{5} + \frac{3}{7} + \frac{4}{9}$$

$$= \frac{126+135+140}{315}$$

$$= \frac{401}{315} \text{ litre}$$

$$\text{Water} \Rightarrow \frac{3}{5} + \frac{4}{7} + \frac{5}{9}$$

$$= \frac{189+180+175}{315} = \frac{544}{315}$$

$\therefore$ Required ratio

$$= \frac{401}{315} : \frac{544}{315} = 401 : 544$$

69. (3) Let 5 kg of mixture be prepared.

$\therefore$ C.P. of 5 kg of mixture

= Rs. (2 × 35 + 3 × 40)

= Rs. (70 + 120)

= Rs. 190

Total S.P. of this mixture

= Rs. (46 + 4 × 55)

= Rs. (46 + 220) = Rs. 266

$\therefore$ Profit per cent

$$= \left(\frac{266-190}{190}\right) \times 100$$

$$= \frac{7600}{190} = 40\%$$

70. (3) In 20 litres of mixture,

$$\text{Milk} \Rightarrow \frac{3}{4} \times 20 = 15 \text{ litres}$$

$$\text{Water} \Rightarrow \frac{1}{4} \times 20 = 5 \text{ litres}$$

Let the quantity of milk added be x litres.

According to the question,

$$\frac{15+x}{5} = \frac{4}{1}$$

$\Rightarrow 15 + x = 4 \times 5$

$\Rightarrow x = 20 - 15 = 5$ litres

71. (1) Quantity of milk in the mixture = $5x$ litres

Quantity of water = x litres

According to the question,

On adding 5 litres of water,

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

$\Rightarrow 10x = 5x + 25$

$\Rightarrow 5x = 25 \Rightarrow x = 5$

$\therefore$ Required quantity of milk

= 5 × 5 = 25 litres

72. (2) Remaining amount of milk = Initial quantity

$$\left(1 - \frac{\text{quantity taken out}}{\text{Initial quantity}}\right)^n$$

$$= 60\left(1 - \frac{12}{60}\right)^2$$

$$= 60\left(1 - \frac{1}{5}\right)^2$$

$$= 60 \times \frac{4}{5} \times \frac{4}{5} = 38.4 \text{ litres}$$

Quantity of water = 60 – 38.4

= 21.6 litres

$\therefore$ Required ratio

= 38.4 : 21.6 = 16 : 9

73. (3) Let the quantity of spirit in the mixture be x litres.

$\therefore$ Quantity of water

= $(x - 3)$ litres

According to the question,

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

$\Rightarrow 3x - 9 = 2x$

$\Rightarrow 3x - 2x = 9$

$\Rightarrow x = 9$ litres

74. (2) In 49 kg. of mixture,

$$\text{Tea of Assam} \Rightarrow \left(\frac{5}{7} \times 49\right) \text{ kg.}$$

= 35 kg.

Tea of Darjeeling $\Rightarrow$ (49 – 35) kg.

= 14 kg.

Let x kg. of Darjeeling tea be added.

$$\therefore \frac{35}{14+x} = \frac{2}{1}$$

$\Rightarrow 28 + 2x = 35$

$\Rightarrow 2x = 35 - 28 = 7$

$$\Rightarrow x = \frac{7}{2} = 3.5 \text{ kg.}$$

75. (3) Let the volumes of three containers be 3 litres, 4 litres and 5 litres respectively.

Container–I

$$\text{Milk} = \frac{4\times3}{5} = \frac{12}{5} \text{ litres},$$

$$\text{Water} = \frac{3}{5} \text{ litre}$$

Container–II

$$\text{Milk} = \frac{4\times3}{4} = 3 \text{ litres},$$

Water = 1 litre

Container–III

$$\text{Milk} = \frac{5\times5}{7} = \frac{25}{7} \text{ litres}$$

$$\text{Water} = \frac{10}{7} \text{ litres}$$

$\therefore$ Required ratio in container–IV

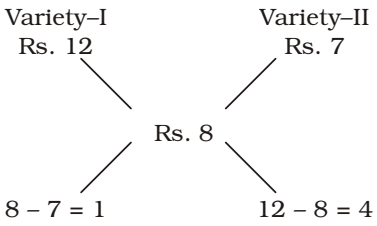
$$= \left(\frac{12}{5}+3+\frac{25}{7}\right) : \left(\frac{3}{5}+1+\frac{10}{7}\right)$$

$$= \left(\frac{84+105+125}{35}\right) : \left(\frac{21+35+50}{35}\right)$$

$$= \frac{314}{35} : \frac{106}{35}$$

= 157 : 53

76. (2) By the rule of alligation,



$\therefore$ Required ratio = 1 : 4

77. (2) In original mixture,

$$\text{Milk} = \frac{3}{4}\times36 = 27 \text{ litres}$$

$$\text{Water} = \frac{1}{4}\times36 = 9 \text{ litres}$$

On adding 15 litres of milk,

Required ratio = (27 + 15) : 9

= 42 : 9 = 14 : 3

78. (2) In 25 litres of mixture,

$$\text{Quantity of milk} = \frac{4}{5}\times25$$

= 20 litres

Quantity of water = 5 litres

On adding 3 litres of water,

Required ratio = 20 : 8 = 5 : 2

79. (2) In 2 litres of first container,

$$\text{Spirit} = \frac{8}{5} \text{ litre, Water} = \frac{2}{5} \text{ litre}$$

In 3 litres of second container,

$$\text{Spirit} = 3\times\frac{11}{15} = \frac{11}{5} \text{ litres}$$

$$\text{Water} = 3\times\frac{4}{15} = \frac{4}{5} \text{ litre}$$

In 4 litres of third container,

$$\text{Spirit} = 4\times\frac{7}{10} = \frac{14}{5} \text{ litres}$$

$$\text{Water} = 4\times\frac{3}{10} = \frac{6}{5} \text{ litres}$$

$\therefore$ Required ratio

$$= \left(\frac{8}{5}+\frac{11}{5}+\frac{14}{5}\right) : \left(\frac{2}{5}+\frac{4}{5}+\frac{6}{5}\right)$$

$$= \frac{33}{5} : \frac{12}{5} = 33 : 12 = 11 : 4$$

80. (1) In 1 litre of first bottle,

$$\text{Quantity of acid} = \frac{2}{5} \text{ litre}$$

$$\text{Quantity of water} = \frac{3}{5} \text{ litre}$$

In 3 litres of second bottle,

$$\text{Quantity of acid} = \frac{3}{3} = 1 \text{ litre}$$

Quantity of water = 2 litres

In the resulting mixture,

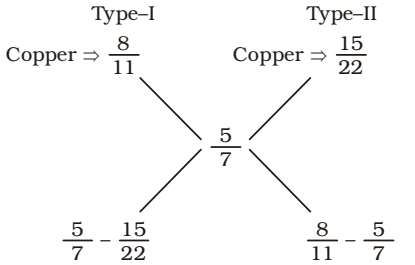
Acid : Water

$$= \left(\frac{2}{5}+1\right) : \left(\frac{3}{5}+2\right)$$

= 7 : 13

$$= \frac{2+5}{5} : \frac{3+10}{5}$$

81. (4)



$\therefore$ Required ratio = $\frac{5}{154} : \frac{1}{77}$

= 5 : 2

TYPE-IX

1. (1) Let the income of A, B and C be ₹ 3x, ₹ 7x and ₹ 4x respectively and their expenses be ₹ 4y, ₹ 3y and ₹ 5y respectively.

$\therefore$ 3x = 2400

$\Rightarrow$ x = 800

$\therefore$ 4y = 2400 – 300 = 2100

$\Rightarrow$ y = 525

$\therefore$ B's saving = (7x – 3y)

= ₹ (7 × 800 – 3 × 525)

= ₹ (5600 – 1575)

= ₹ 4025

and C's savings = ₹ (4x – 5y)

= ₹ (3200 – 2625) = ₹ 575

2. (4) Income in the second year = ₹ 45000

Income in the first year = ₹ 30000

Expense in the first year = ₹ 25000

Expense in the second year = ₹ 45000

$\therefore$ Total saving

= 75000 – 70000 = ₹ 5000

3. (4) Given

$$\frac{\text{Monthly income of A}}{\text{Monthly income of B}} = \frac{5}{6}$$

$\therefore$ Monthly income of A = 5x

and that of B = 6x (x is a constant)

According to the question

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

20x – 7200 = 18x – 4800

2x = 2400

$\therefore$ x = 1200

$\therefore$ Monthly income of B

= 1200 × 6 = ₹ 7200

4. (1) Let income of two persons be 5x and 3x.

and their expenses be 9y and 5y respectively.

Then, 5x – 9y = 1300 ..(i)

and 3x – 5y = 900 ..(ii)

By 9 × (ii) – 5 × (i), we get

27x – 45y = 8100

25x – 45y = 6500

– + –

2x = 1600

$\Rightarrow$ x = 800

Now, income of first person
= 5x = 5 × 800 = ₹ 4000
and that of second person
= 3x = 3 × 800 = ₹ 2400

5. (4) Let the annual income of A and B be ₹ $4x$ and $3x$ respectively. Also let their annual expenditures be ₹ $3y$ and $2y$ respectively
According to question,
$4x - 3y = 600$ ...(i)
$3x - 2y = 600$ ...(ii)
From equation (i) and (ii)
$4x - 3y = 3x - 2y \Rightarrow x = y$
From equation (i)
$4x - 3x = 600 \Rightarrow x = 600$
Annual income of A
$= 4x = 4 \times 600 = ₹\ 2400$

6. (1) Income of A = ₹ 7x ;
B = ₹ 9x and C = ₹ 12x
Expenses of A = ₹ 8y ;
B = ₹ 9y and C = ₹ 15y

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

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

$\Rightarrow \frac{21x}{4} = 8y \Rightarrow 21x = 32y.$

$\therefore$ A's saving $= \frac{1}{4} \times 7x$

$= \frac{1}{4} \times \frac{32}{3}y = \frac{8}{3}y$

B's saving $= 9x - 9y$

$= 9 \times \frac{32}{21}y - 9y$

$= \frac{96y - 63y}{7}$

$= \frac{33y}{7}$

C's saving $= 12x - 15y$

$= 12 \times \frac{32}{21}y - 15y$

$= \frac{128y - 105y}{7}$

$= \frac{23y}{7}$

$\therefore$ Required ratio

$= \frac{8}{3}y : \frac{33}{7}y : \frac{23}{7}y$

= 56 : 99 : 69

7. (3) Let the income of P and Q be ₹ $3x$ and $4x$ respectively.
Again, let their expenditures be ₹ $2y$ and $3y$ respectively.
According to the question.
$3x - 2y = 6000$ ...(i)
and $4x - 3y = 6000$ ...(ii)
From equations (i) and (ii)
$3x - 2y = 4x - 3y$
or, $4x - 3x = 3y - 2y$
or, $x = y$
From equation (i),
$\Rightarrow 3x - 2x = 6000$
$x = 6000$
The income of P = ₹ $3x$
= ₹ (3 × 6000) = ₹ 18000

8. (3) Let his expenditures be ₹ $26x$ and savings be ₹ $3x$.
$\therefore 26x + 3x = 7250$
$\Rightarrow 29x = 7250$

$\Rightarrow x = \frac{7250}{29} = 250$

$\therefore$ Savings = $3x$ = ₹ 750

9. (2) Let the monthly salary of A, B & C be $2x$, $3x$ and $5x$
now, $5x - 2x = 12{,}000$
$\Rightarrow 3x = 12000$ or $x = 4000$
$\therefore$ Monthly salary of B = 3 × 4000
= 12,000
$\Rightarrow$ Annual salary of B
= 12000 × 12 = ₹ 144000

10. (1) Let the income of two persons be ₹ $5x$ and ₹ $3x$ respectively and their expenditures be ₹ $9y$ and $5y$ respectively.
As given,
$5x - 9y = 2600$ ...(i)
$3x - 5y = 1800$ ...(ii)
By 5 × (i) – 9 × (ii) we get
$25x - 27x = 13000 - 16200$
$\Rightarrow -2x = -3200$

$\Rightarrow x = \frac{3200}{2} = 1600$

$\therefore$ First person's income
= ₹(1600 × 5) = ₹ 8000
Second person's income
= $3x$ = ₹ (1600 × 3)
= ₹ 4800

11. (3) Let the income of two persons (A and B) be ₹ $2x$ and ₹ $3x$ respectively. Again let the expenditures of A and B be ₹ $5y$ and ₹ $9y$ respectively.
$\therefore 2x - 5y = 600$ ...(i)
$3x - 9y = 600$ ...(ii)
From equations (i) and (ii),
$2x - 5y = 3x - 9y$
$\Rightarrow x = 4y$
From equation (i),
$2 \times 4y - 5y = 600$
$\Rightarrow 3y = 600$
$= y = 200$
$\therefore x = 4 \times 200 = 800$
$\therefore$ A's income = $2x = 2 \times 800$
= ₹ 1600
B's income = $3x = 3 \times 800$
= ₹ 2400

12. (3) Rice : Wheat
= 4 × 5 : 3 × 6
= 20 : 18 = 10 : 9
$\therefore$ Total cost of rice

$= \frac{10}{19} \times 380 = ₹\ 200$

13. (2) Let the income of A be ₹ $5x$ and that of B be ₹ $6x$.
According to the question,
$6x - 5x = 1100$
$\Rightarrow x = 1100$
$\therefore$Total income = $5x + 6x$
= ₹ $11x$
= ₹ (11×1100) = ₹ 12100

14. (1) Let the income of A and B be ₹ $5x$ and ₹ $3x$ respectively.
Let the expenses of A, B and C be ₹ $8y$, Rs. $5y$ and ₹ $2y$ respectively. Then,
$2y = 2000$

$\Rightarrow y = \frac{2000}{2} = 1000$

B saves = ₹ 700
$\therefore 3x - 5y = 700$
$\Rightarrow 3x - 5 \times 1000 = 700$
$\Rightarrow 3x = 700 + 5000 = 5700$

$\Rightarrow x = \frac{5700}{3} = 1900$

$\therefore$ A's saving = ₹ $(5x - 8y)$
= ₹ (5×1900–8×1000)
= ₹ (9500 – 8000) = ₹ 1500

15. (4) Let the income of man be ₹ = $11x$ and his expenditure be ₹ $10x$.
$\therefore$ Savings = x = ₹ 9000
$\therefore$ Monthly income of man

$= \frac{11 \times 9000}{12} = ₹\ 8250$

16. (1) Income of the family

$= \frac{10}{7} \times 10500 = ₹\ 15000$

Savings = 15000 – 10500
= ₹ 4500

17. (2) Let the monthly income of A and B be ₹ $4x$ and ₹ $3x$ respectively and their expenditures be ₹ $3y$ and Rs. $2y$ respectively.
$\therefore 4x - 3y = 6000$
and $3x - 2y = 6000$
$\Rightarrow 4x - 3y = 3x - 2y$

$\Rightarrow x = y$

$\therefore 4x - 3y = 6000$

$\Rightarrow x = 6000$

$\Rightarrow$ A's monthly income $= 4x$

$= ₹\ 24000$

18. (2) Let A's and B's weekly income be ₹ $9x$ and ₹ $7x$ and their expenditures be ₹ $4y$ and $3y$ respectively.

Then, $9x - 4y = 200$ ...(i)

and $7x - 3y = 200$ ...(ii)

$\Rightarrow 9x - 4y = 7x - 3y$

$\Rightarrow 9x - 7x = 4y - 3y$

$\Rightarrow 2x = y$ ...(iii)

From equation (i),

$9x - 4y = 200$

$\Rightarrow 9x - 8x = 200$

$\Rightarrow x = 200$

$\therefore$ Sum of their weekly income

$= 16x = 16 \times 200 = ₹\ 3200$

19. (1) A : B = 3 : 2 = 9 : 6

B : C = 3 : 2 = 6 : 4

$\therefore$ A : B : C = 9 : 6 : 4

$$\therefore \frac{9x}{3} - \frac{4x}{4} = 1000$$

$\Rightarrow 3x - x = 1000$

$\Rightarrow 2x = 1000$

$\Rightarrow x = 500$

$\therefore$ B's income $= 6x = 6 \times 500$

$= ₹\ 3000$

20. (4) Let the income of A and B be ₹ $2x$ and ₹ $3x$. and their expenditures be ₹ y and ₹ $2y$ respectively.

$\therefore 2x - y = 24000$ ...(i)

and $3x - 2y = 24000$ ...(ii)

By equation (i) $\times 2$ – (ii),

$4x - 2y - 3x + 2y = 24000$

$\Rightarrow x = 24000$

$\therefore$ A's income $= 2 \times 24000$

$= ₹\ 48000$

21. (3) Let the annual income of A and B be ₹ $4x$ and ₹ $3x$ and their income be Rs. $3y$ and Rs. $2y$. respectively.

$\therefore 4x - 3y = 60000$ ...(i)

and $3x - 2y = 60000$ ...(ii)

Clearly, $4x - 3y = 3x - 2y$

$\Rightarrow x = y$

From equation (i),

$x = 60000$

$\therefore$ A's annual income

$= 4x = 4 \times 60000$

$= ₹\ 240000$

22. (3) If the ratio of the income of A and B be $a : b$ and that of their expenses be $c : d$ and each saves ₹ x, then,

$$\text{A's income} = \frac{ax(d-c)}{ad-bc}$$

$$= \frac{9 \times 500(7-8)}{9 \times 7 - 8 \times 8}$$

$= 9 \times 500 = ₹\ 4500$

23. (2) Let Annual Income of A, B and C be x, $3x$ and $7x$

$x + 7x = 800000$

$\Rightarrow 8x = 800000$

$\Rightarrow x = 100000$

$\therefore$ B's monthly income

$$= \frac{100000 \times 3}{12} = ₹\ 25000$$

24. (4) Amit's income = ₹ $3x$ and his expenditure = ₹ $5y$

Veeri's income = ₹ $2x$ and his expenditure = ₹ $3y$

$\therefore 3x - 5y = 2x - 3y$

$\Rightarrow x = 2y$

$\therefore 3x - 5y = 1000$

$\Rightarrow 6y - 5y = 1000 \Rightarrow y = 1000$

$\therefore x = 2000$

$\therefore$ Amit's income

$= 3x = 3 \times 2000 = ₹\ 6000$

25. (3) Income of A and B

= ₹ $6x$ and $5x$

Expenses of A and B

= ₹ $4y$ and $3y$

$\therefore 6x - 4y = 400$ ...(i)

$5x - 3y = 400$ ...(ii)

By equation (i)$\times 3$ – (ii) $\times 4$

$\Rightarrow 18x - 12y - 20x + 12y$

$= 1200 - 1600$

$\Rightarrow 2x = 400 \Rightarrow x = 200$

$\therefore$ Total income

$= 6x + 5x = 11x = ₹\ 2200$

26. (1) x's income = Rs. $4a$

y's income = Rs. $3a$

x's expenditure = Rs. $12b$

y's expenditure = Rs. $7b$

$\therefore 4a - 12b = 3200$

$\Rightarrow a - 3b = 800$ ...(i)

Again, $3a - 7b = 3200$ ...(ii)

By equation (i) $\times 7$ – (ii) $\times 3$,

$$\begin{array}{r} 7a - 21b = 5600 \\ 9a - 21b = 9600 \\ - \quad + \quad - \\ \hline -2a = -4000 \end{array}$$

$\Rightarrow a = 2000$

$\Rightarrow x$'s income $= 4a$

$= 4 \times 2000 =$ Rs. 8000

27. (1) Let incomes of A and B be Rs. $3x$ and Rs. $2x$ respectively. Let the expenditures of A and B be Rs. $5y$ and Rs. $3y$ respectively. According to the question,

$3x - 5y =$ Rs. 1000 .... (i)

$2x - 3y =$ Rs. 1000 .... (ii)

By equation (i) $\times 2$ – (ii) $\times 3$,

$$\begin{array}{r} 6x - 10y = 2000 \\ 6x - 9y = 3000 \\ - \quad + \quad - \\ \hline -y = -1000 \end{array}$$

$\therefore y = 1000$

From equation (i),

$3x - 5 \times 1000 = 1000$

$\Rightarrow 3x = 1000 + 5000 =$ Rs. 6000

= A's income

28. (2) A's monthly income = Rs. $8x$

A's monthly expenditure= Rs. $5y$

B's monthly income = Rs. $5x$

B's monthly expenditure= Rs. $3y$

According to the question,

$8x - 5y = 12000$ ....(i)

$5x - 3y = 10000$ ....(ii)

By equation (i) $\times 3$ – (ii) $\times 5$,

$24x - 15y = 36000$

$25x - 15y = 50000$

$- \quad + \quad -$

$-x = -14000$

$\Rightarrow x = 14000$

Difference between monthly incomes of A and B $= 8x - 5x$

= Rs. $3x$ = Rs. (3×14000)

= Rs. 42000

29. (4) Expenditure : Savings

= 61 : 6

Sum of the terms of ratio

= 61 + 6 = 67

Total monthly salary

= Rs. 8710

$\therefore$ Monthly savings

$$= \text{Rs. } \left(\frac{6}{67} \times 8710\right)$$

= Rs. 780

30. (3) Let A's income be Rs. $2x$.

$\therefore$ B's income = Rs. $(2x - 140)$

C's income = Rs. $3x$

$\therefore$ D's income = Rs. $(3x - 80)$

According to the question,

B : D = 1 : 2

$\therefore 2(2x - 140) = 3x - 80$

$\Rightarrow 4x - 280 = 3x - 80$

$\Rightarrow 4x - 3x = 280 - 80$

$\Rightarrow x =$ Rs. 200

$\therefore$ A's income = Rs. (2×200) = Rs. 400

B's income = Rs. (400 – 140)

= Rs. 260

C's income = Rs. (3×200)

= Rs. 600

D's income = Rs. (600 – 80)

= Rs. 520

TYPE-X

1. (2) Using Rule1,
Ratio of the values
$= 2 : \frac{3}{2} : \frac{4}{4}$
$= 4 : 3 : 2$
$\therefore$ Value of 50 paise coins
$= \frac{3}{9} \times 180 = ₹\ 60$
Numbers of 50 paise coins
$= 120$.

2. (1) The ratio of values of rupee, 50 paise and 25 paise coins = 13 : 11 : 7
$\therefore$ Ratio of their numbers
$= 13 \times 1 : 11 \times 2 : 7 \times 4$
$= 13 : 22 : 28$
Sum of the ratios
$= 13 + 22 + 28 = 63$
$\therefore$ Required number of 50 paise coins $= \frac{22}{63} \times 378 = 132$

3. (2) Ratio of values of 50 paise, 25 paise and 10 paise coins
$= \frac{2}{2} : \frac{3}{4} : \frac{5}{10} = 1 : \frac{3}{4} : \frac{1}{2}$
$= 4 : 3 : 2$
Sum of the ratios = 4 + 3 + 2 = 9
Value of 25 paise coins
$= \frac{3}{9} \times 90 = ₹\ 30$
Number of 25 paise coins
$= 30 \times 4 = 120$

4. (3) Ratio of the number of coins
= 8 : 5 :3
Ratio of their values
$= 8 : \frac{5}{2} : \frac{3}{4} = 32 : 10 : 3$
Sum of the ratios
$= 32 + 10 + 3 = 45$
$\therefore$ Value of one rupee coins
$= \frac{32}{45} \times 225 = ₹\ 160$
$\therefore$ Number of one rupee coins
= 160

5. (2) Ratio of number of 1 rupee, 50-paise and 25 paise coins
= 8 : 5 : 3
Ratio of their respective values
$= 8 : \frac{5}{2} : \frac{3}{4} = 32 : 10 : 3$
Sum of the ratios
$= 32 + 10 + 3 = 45$
Value of 50 paise coins
$= ₹ \left(\frac{10}{45} \times 112.5\right) = ₹\ 25$
$\therefore$ Number of 50 paise coins
$= 25 \times 2 = 50$

6. (2) Ratio of the number of coins of Re. 1, 50 paise and 25 paise
= 3 : 8 : 20
Ratio of the values of these coins
$= 3 : \frac{8}{2} : \frac{20}{4} = 3 : 4 : 5$
$\therefore$ Value of 1 rupee coins
$= \frac{3}{12} \times 372 = ₹\ 93$
Value of 50 paise coins
$= \frac{4}{12} \times 372 = ₹\ 124$
Value of 25 paise coins
$= \frac{5}{12} \times 372 = ₹\ 155$
$\therefore$ Number of coins
$= 93 + 124 \times 2 + 155 \times 4$
$= 93 + 248 + 620 = 961$

7. (4) Respective ratio of the number of coins
$= 13 : 11 \times 2 = 13 : 22$
$\therefore$ Number of 1 rupee coins
$= \frac{13}{13+22} \times 210$
$= \frac{13}{35} \times 210 = 78$

8. (3) Ratio of the value of coins
$= \frac{1}{2} : \frac{2}{4} : \frac{3}{10} = 5 : 5 : 3$
$\therefore$ Value of the 10-paise coins
$= ₹ \left(\frac{3}{13} \times 6.50\right) = ₹\ 1.5$
$\therefore$ Number of 10-paise coins
$= 1.5 \times 10 = 15$

9. (2) Let the number of each type of notes be x
$\therefore$ x + 5x + 10 x = 640
$\Rightarrow$ 16 x = 640 $\Rightarrow$ x = 40
$\therefore$ Total number of notes
$= 3 \times 40 = 120$

10. (1) Let the number of coins of 1-rupee coin be x.
Total value of the coins of each kind is same, then the number of 50 paisa coins = $2x$ and the number of 25 paisa coins = $4x$.
According to the question.
$x + 2x + 4x = 175$
$7x = 175 \therefore x = \frac{175}{7} = 25$
$\therefore$ Total amount in bag
$= 25 + 25 + 25 = ₹\ 75$

11. (3) Ratio of values = 5 : 3 : 1
Ratio of their numbers
= 10 : 12 : 10 = 5 : 6 : 5
$\therefore$ Number of 50 paise coins
$= \frac{5}{16} \times 480 = 150$
Number of 25 paise coins
$= \frac{6}{16} \times 480 = 180$
Number of 10 paise coins
$= \frac{5}{16} \times 480 = 150$

12. (4) Ratio of their values =13:11:7
Ratio of their numbers
$= 13 : 22 : 35$
$\therefore 13x + 22x + 35x = 420$
$\Rightarrow 70x = 420 \Rightarrow x = 6$
$\therefore$ Number of 50 paise coins
$= 22x = 22 \times 6 = 132$

13. (2) Number of 1-rupee coins $= x$
Number of 50 paise coins $= 4x$
Number of 25 paise coins $= 2x$
$\therefore$ Ratio of their values
$= x : \frac{4x}{2} : \frac{2x}{4} = 2 : 4 : 1$
$\therefore$ Value of 50-paise coins
$= \frac{4}{7} \times 56 = ₹\ 32$
$\therefore$ Their number $= 32 \times 2 = 64$
Aliter :
$(x)(1) + (4x)\left(\frac{1}{2}\right) + (2x)\left(\frac{1}{4}\right) = 56$
$x + 2x + \frac{1}{2}x = 56$
$\Rightarrow x = 56 \times \frac{2}{7} = 16$
$\Rightarrow$ No. of 50p coins $= 4 \times 16 = 64$.

14. (3) Let the initial salaries of A, B and C be ₹ x, ₹ $3x$ and ₹ $4x$ respectively.
Respective ratio after corresponding increase

$$= \frac{x\times105}{100} : \frac{3x\times110}{100} : \frac{4x\times115}{100}$$

$$= 105 : 330 : 460$$

$$= 21 : 66 : 92$$

15. (2) If the salaries of A, B and C be ₹ x, ₹ y and ₹ z respectively, then

$$\frac{x\times20}{100} : \frac{y\times15}{100} : \frac{z\times25}{100}$$

$$\Rightarrow \frac{x}{5} : \frac{3y}{20} : \frac{z}{4} = 8 : 9 : 20$$

$$\Rightarrow x : y : z = 40 : 60 : 80$$

$$= 2 : 3 : 4$$

$$\therefore \text{ A's salary } = \frac{2}{9} \times 72000$$

= ₹ 16000

16. (3) Ratio of the values of one rupee, 50 paise and 25 paise coins = 8 : 4 : 3
Ratio of their number
= 8 : 4 × 2 : 3 × 4 = 2 : 2 : 3
Sum of ratios = 2 + 2 + 3 = 7
∴ Number of 50-paise coins

$$= \frac{2}{7}\times280 = 80$$

TYPE-XI

1. (4) Orginal ratio of A, B and C

$$= \frac{1}{2} : \frac{1}{3} : \frac{1}{4} = 6 : 4 : 3$$

∴ Share of A

$$= \frac{6}{13}\times117 = ₹\ 54$$

Share of B

$$= \frac{4}{13}\times117 = ₹\ 36$$

and share of C

$$= \frac{3}{13}\times117 = ₹\ 27$$

The ratio of A, B and C by mistake = 2 : 3 : 4

$$\therefore \text{ Share of A } = \frac{2}{9}\times117 = ₹\ 26$$

$$\text{Share of B } = \frac{3}{9}\times117 = ₹\ 39$$

$$\text{Share of C } = \frac{4}{9}\times117 = ₹\ 52$$

Therefore, it is clear from above calculation that C gains maximum i.e. ₹ 25.

2. (3) According to question,
A : B = 2 : 1
B : C = 4 : 1
∴ A : B : C = 8 : 4 : 1

3. (1) A : B = 5 : 2
B : C = 7 : 13
∴ A : B : C
= 5 × 7 : 2 × 7 : 2 × 13
= 35 : 14 : 26
Sum of the ratios
= 35 + 14 + 26 = 75
Total amount = ₹ 7500

$$\therefore \text{ B's share } = ₹\ \frac{14}{75}\times7500$$

= ₹ 1400

4. (2) A : B = 6 : 5, B : C = 10 : 9
A : B : C = 6 : 5
10 : 9
60 : 50 : 45
=12 : 10 : 9
According to the question
(12 + 10 + 9) units ⇒ 1240

$$9 \text{ units } = \frac{1240}{31}\times9$$

⇒ ₹ 360

5. (1)

A : B = 2 : 3
B : C = 4 : 3
C : D = 2 : 3
A : B : C : D = 2×4×2 : 3×4×2 : 3×3×2 : 3×3×3
or, A : B : C : D = 16 : 24 : 18 : 27
Sum of the ratios
= 16 + 24 + 18 + 27 = 85

$$\text{B's share } = ₹\ \frac{24}{85}\times3400$$

= ₹ 960

$$\text{D's share } = ₹\ \frac{27}{85}\times3400$$

= ₹ 1080
The required sum
= ₹ (1080 + 960) = ₹ 2040

6. (1) A : B = 5 : 2
B : C = 7 : 13
A : B : C = 5×7 : 7×2 : 2×13
= 35 : 14 : 26
Sum of the ratios
= 35 + 14 + 26 = 75

$$\text{A's share } = ₹\ \frac{35}{75}\times750$$

= ₹ 350

7. (4) Ratio = $\frac{1}{2} : \frac{1}{4} : \frac{5}{16}$
= 8 : 4 : 5
Sum of ratios = 8 + 4 + 5 = 17
∴ Required answer

$$= ₹\ \left(\frac{8-4}{17}\right)\times68000$$

$$= ₹\ \frac{4}{17}\times68000$$

= ₹ 16000

8. (4) Ratio = $\frac{3}{5} : 2 : \frac{5}{3}$
= 9 : 30 : 25
Sum of ratios = 9 + 30 + 25
= 64
∴ Share of second worker

$$= \frac{30}{64}\times6400 = ₹\ 3000$$

9. (2) $A = B\times\frac{2}{9} = \frac{2B}{9}$

$$C = \frac{3A}{4} \ ; \ A = \frac{4}{3}C$$

∴ Ratio of A : B : C = 4 : 18 : 3

$$\text{Share of A } = \frac{4}{25}\times1250 = ₹\ 200$$

$$\text{Share of B } = \frac{18}{25}\times1250 = ₹\ 900$$

$$\text{Share of C } = \frac{3}{25}\times1250 = ₹\ 150$$

10. (4) A's share $= 9000\times\frac{4}{15}$
= 600 × 4 = ₹ 2400

$$\text{C's share } = 9000\times\frac{6}{15}$$

= 600 × 6 = ₹ 3600
∴ Difference = 3600 – 2400
= ₹ 1200

11. (4) A : B = 3 : 4
B : C = 3 : 4
A : B : C = 9 : 12 : 16

$$\therefore \text{ A's share } = \frac{9}{9+12+16}\times₹\ 370$$

= ₹ 90

12. (4) Let the amount to be distributed be ₹ x.
P : Q : R = 2 : 7 : 9
Sum of the ratios = 2+7 + 9 = 18

$$\therefore \text{ P } = \frac{2}{18}\times x = \frac{x}{9}$$

$Q = \frac{7}{18}x$

$R = \frac{9x}{18} = \frac{x}{2}$

As given,

$\frac{x}{9} + \frac{7x}{18} = \frac{x}{2}$

Thus, we get no conclusion. Amount should necessarily be known.

13. (4) According to the question,
A : B = 5 : 12 = 10 : 24
B : C = 4 : 5.50 = 24 : 33
∴ A : B : C = 10 : 24 : 33
Sum of the ratios
= 10 + 24 + 33 = 67
Difference between the shares of C and B

$= ₹ \left(\frac{33-24}{67} \times 2010\right)$

$= ₹ \left(\frac{9}{67} \times 2010\right) = ₹ 270$

14. (3) $\frac{2}{5}A + 40 = \frac{2}{7}B + 20$

$= \frac{9}{17}C + 10 = x$

$\therefore A = \frac{5}{2}(x-40), B = \frac{7}{2}(x-20)$

and, $C = \frac{17}{9}(x-10)$

$\therefore \frac{5}{2}(x-40) + \frac{7}{2}(x-20) + \frac{17}{9}(x-10)$
= 600
$\Rightarrow x = 100$

∴ A's share = $₹ \frac{5}{2}(100 - 40)$
= ₹ 150

15. (2) When A gets 100 paise, B gets 90 Paise
When B gets 100 paise, C gets 110 paise
∴ When B gets 90 paise, C gets

$\frac{110}{100} \times 90$ = 99 paise

∴ A : B : C = 100 : 90 : 99
Sum of the ratios
= 100 + 90 + 99 = 289

$\therefore$ B' share = $\left(\frac{90}{289} \times 86700\right)$

= ₹ 27000

16. (1) A : B = 2 : 3
B : C = 4 : 5
∴ A : B : C = 8 : 12 : 15

∴ B's share = $\frac{12}{35} \times 7000$

= ₹ 2400

17. (3) Suppose amount received by men = 5x.
and amount received by women = 4x
According to question
5x + 4x = 180
$\Rightarrow$ 9x = 180 $\Rightarrow$ x = 20
∴ Amount received by men
= ₹ 100
Amount received by women= ₹ 80
Suppose the number of men be y and that of women be (66 – y).
According to question

$\frac{\frac{100}{y}}{\frac{80}{66-y}} = \frac{3}{2}$

$\Rightarrow \frac{100}{y} \times \frac{66-y}{80} = \frac{3}{2}$

$\Rightarrow \frac{5(66-y)}{4y} = \frac{3}{2}$

$\Rightarrow$ 660 – 10y = 12y
$\Rightarrow$ 22y = 660 $\Rightarrow$ y = 30

18. (2) B's share

$= \frac{3}{(2+3+4)} \times 738$

$= \frac{3}{9} \times 738 = ₹ 246$

19. (4) A × 0.5 = B × 0.6 = C × 0.75

$\Rightarrow \frac{A \times 5}{10} = \frac{B \times 6}{10} = C \times \frac{75}{100}$

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

$\therefore$ A : B : C = $2 : \frac{5}{3} : \frac{4}{3}$
= 6 : 5 : 4
∴ C's share

$= \frac{4}{15} \times 1740 = ₹ 464$

20. (2) Amount received by y
= ₹ 100.
Amount received by x = ₹ 125.
Amount received by z

$= \frac{100 \times 100}{75} = ₹ \frac{400}{3}$

∴ Required ratio

$= 125 : 100 : \frac{400}{3}$

$= 5 : 4 : \frac{16}{3} = 15 : 12 : 16$

21. (2) B = C + 8
A = C + 8 + 7 = C + 15
∴ C + 15 + C + 8 + C = 53
$\Rightarrow$ 3C + 23 = 53
$\Rightarrow$ 3C = 53 – 23 = 30
$\Rightarrow$ C = ₹ 10
∴ B = C + 8 = 10 + 8 = ₹ 18
A = C + 15 = 10 + 15
= ₹ 25
∴ A : B : C = 25 : 18 : 10

22. (2) A : B = 2 : 3 = 8 : 12
B : C = 4 : 5 = 12 : 15
∴ A : B : C = 8 : 12 : 15
Sum of ratios = 35

∴ A's share = $\frac{8}{35} \times 700$

= ₹ 160

B's share = $\frac{12}{35} \times 700$

= ₹ 240

C's share = $\frac{15}{35} \times 700$

= ₹ 300

23. (2) A : B : C = $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

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

[LCM of 2, 3 and 4 = 12]
= 6 : 4 : 3

A's share = $\frac{6}{13} \times 2600$

= ₹ 1200

B's share = $\frac{4}{13} \times 2600$

= ₹ 800

C's share = $\frac{3}{13} \times 2600$ = ₹ 600

24. (2) According to question,
P + Q + R = ₹ 300
Now, Q = P + 30
R = Q + 60
= P + 30 + 60 = P + 90
Hence, P + Q + R = ₹ 300
$\Rightarrow$ P + P + 30 + P + 90 = 300
$\Rightarrow$ 3P + 120 = 300

$\Rightarrow P = \frac{180}{3} = 60$

∴ Share of P = ₹ 60, Q = ₹ 90
R = ₹ 150
$\Rightarrow$ P : Q : R = 60 : 90 : 150
= 6 : 9 : 15
= 2 : 3 : 5 :

25. (3) $A \times \frac{1}{2} = B \times \frac{1}{3} = C \times \frac{1}{4}$

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

$\therefore$ A : B : C = 2 : 3 : 4

$\therefore$ A $\Rightarrow \frac{2}{9} \times 900$ = ₹ 200

B $\Rightarrow \frac{3}{9} \times 900$ = ₹ 300

C $\Rightarrow \frac{4}{9} \times 900$ = ₹ 400

26. (3) A : B : C = 2 : 5 : 4

Sum of ratios = 2 + 5 + 4 = 11

Difference

$= \left(\frac{5}{11} - \frac{2}{11}\right) \times 126.50$

$= \frac{3}{11} \times 126.50$ = ₹ 34.50

27. (2) B's share = Rs. b

A's share = Rs. $(b + 7)$

C's Share = Rs.$(b - 6)$

$\therefore b + b + 7 + b - 6 = 76$

$\Rightarrow 3b = 76 - 1 = 75$

$\Rightarrow b$ = Rs. 25

$\therefore$ A's share = 25 + 7 = Rs. 32

C's share = 25 – 6 = Rs. 19

$\therefore$ Required ratio = 32 : 25 : 19

28. (4) $A = \frac{1}{3}$ (B + C)

$\Rightarrow 3A = B + C$ ...(i)

$B = \frac{2}{3}$ (A + C)

$\Rightarrow 3B = 2A + 2C$ ...(ii)

From equation (i),

$3A = B + C$

$\Rightarrow 9A = 3B + 3C$

$\Rightarrow 9A = 2A + 2C + 3C$

$\Rightarrow 7A = 5C$ ...(iii)

From equation (ii),

$3B = 2\left(\frac{5C}{7}\right) + 2C$

$\Rightarrow 21B = 10C + 14C$

$\Rightarrow 21B = 24C$

$\Rightarrow 7B = 8C$ ...(iv)

From equations (iii) and (iv),

$C = \frac{7A}{5} = \frac{7B}{8}$

$\therefore \frac{A}{5} = \frac{B}{8} = \frac{C}{7}$

C's share = $\frac{7}{(5+8+7)} \times 3000$

= ₹ $\left(\frac{7}{20} \times 3000\right)$ = ₹ 1050

29. (1) **Case I**

A : B : C = $\frac{1}{4} : \frac{1}{5} : \frac{1}{6}$

$= \frac{1}{4} \times 60 : \frac{1}{5} \times 60 : \frac{1}{6} \times 60$

[LCM of 4, 5 and 6 = 60]

= 15 : 12 : 10

Sum of ratios = 15 + 12 + 10 = 37

$\therefore$ C's share = $\frac{10}{37} \times 555$

= ₹ 150

Case II

A : B : C = 4 : 5 : 6

Sum of ratios = 4 + 5 + 6 = 15

$\therefore$ C's share = $\frac{6}{15} \times 555$

= ₹ 222

$\therefore$ Required answer

= ₹ (222 – 150) = ₹ 72

30. (1) Son : wife = 3 : 1 = 9 : 3

Wife : daughter = 3 : 1

$\therefore$ Son : wife : daughter

= 9 : 3 : 1

Sum of ratios = 9 + 3 + 1 = 13

If total wealth be ₹ x, then

Son's share – daughter's share

= ₹ 10,000

$\Rightarrow \frac{9x}{13} - \frac{x}{13} = 10{,}000$

$\Rightarrow \frac{9x - x}{13} = 10{,}000$

$\Rightarrow 8x = 13{,}00{,}00$

$\Rightarrow x = \frac{13{,}00{,}00}{8}$ = ₹ 16250

31. (2) A : B = 3 : 4

B : C = 3.5 : 3 = 7 : 6

$\therefore$ A : B : C = (3 × 7) : (4 × 7) : (4 × 6)

= 21 : 28 : 24

Sum of ratios = 21+28 + 24 = 73

$\therefore$ Difference between the shares of B and C

$= \left(\frac{28 - 24}{73}\right) \times 730$

= 4 × 10 = Rs. 40

32. (3) A : B : C : D = 7 : 6 : 3 : 5

Sum of ratios = 7+ 6 + 3 + 5 = 21

$\therefore$ Difference of shares of B and C = Rs. 270

If the total amount be Rs. x, then

$\left(\frac{6-3}{21}\right)x$ = 270

$\Rightarrow 3x = 21 \times 270$

$\Rightarrow x = \frac{21 \times 270}{3}$ = Rs. 1890

$\therefore$ D's share = $\frac{5}{21} \times 1890$

= Rs. 450

33. (4) B's capital = Rs. x

$\therefore$ A's capital = Rs. $2x$.

Ratio of equivalent capitals of A and B for 1 month

$= \left(2x \times 10 + \frac{3x}{2} \times 2\right) : \left(x \times 8 + \frac{x}{2} \times 4\right)$

$= (20x + 3x) : (8x + 2x)$

$= 23x : 10x = 23 : 10$

34. (1) A's investment = Rs. $3x$

B's investment = Rs. $5x$

C's investment = Rs. $5x$

Ratio of the equivalent capitals of A, B and C for 1 month

$= (3x \times 12) : (5x \times 12) : (5x \times 6)$

$= 36x : 60x : 30x$

= 6 : 10 : 5

35. (3) Ratio of equivalent capitals of A, B and C for 1 month

$= (16000 \times 3 + 11000 \times 9) : (12000 \times 3 + 17000 \times 9) : (21000 \times 6)$

= (48000 + 99000) : (36000 + 153000) : 126000

= 147000 : 189000 : 126000

= 49 : 63 : 42

= 7 : 9 : 6

Sum of ratios = 7 + 9 + 6 = 22

$\therefore$ Required difference

= Rs. $\left(\frac{9-6}{22} \times 26400\right)$

= Rs. $\frac{3 \times 26400}{22}$ = Rs. 3600

36. (4) A : C = 2 : 1 = 6 : 3

A : B = 3 : 2 = 6 : 4

$\therefore$ A : B : C = 6 : 4 : 3

$\therefore$ Sum of the terms of ratio

= 6 + 4 + 3 = 13

$\therefore$ B's share

= Rs. $\left(\frac{4}{13} \times 157300\right)$

= Rs. 48400

37. (1) Ratio = 8 : 4 : 7

Sum of the terms of ratio

= 8 + 4 + 7 = 19

$\therefore$ Share of 4 women

= Rs. $\left(\frac{7}{19}\times 380\right)$

= Rs.140

1 women's share = $\frac{140}{4}$

= Rs. 35

38. (2) Let the total amount be Rs. x.
It is given that,
A : B : C = 5 : 6 : 9
Sum of the terms of ratio
= 5 + 6 + 9 = 20

$\therefore$ A's share = Rs. $\frac{5x}{20}$

= Rs. $\frac{x}{4}$

$\therefore \frac{x}{4}$ = Rs. 450

$\Rightarrow x$ = Rs. (4 × 450)
= Rs. 1800

39. (1) According to the question,

$A = \frac{B}{2} = 3C \Rightarrow \frac{A}{1} = \frac{B}{2} = \frac{C}{\frac{1}{3}}$

$\therefore$ A : B : C = 1 : 2 : $\frac{1}{3}$

= 3 : 6 : 1
Sum of the terms of ratio
= 3 + 6 + 1 = 10

$\therefore$ C's share = Rs. $\left(\frac{1}{10}\times 490\right)$

= Rs. 49

40. (4) A : B = $\frac{1}{3} : \frac{1}{5}$ = 5 : 3

Sum of the terms of ratio
= 5 + 3 = 8
Total profit = Rs. 960
$\therefore$ Difference between their shares

= $\left(\frac{5}{8}-\frac{3}{8}\right)$ of 960

= $960\times\frac{1}{4}$ = Rs. 240

41. (2) Let the shares of three brothers be Rs. a, Rs. b and Rs. c respectively.
According to the question,

$b = \frac{-5}{13}(a + c)$

$\Rightarrow \frac{13b}{5} = a + c$ ..... (i)

$\therefore$ $a + b + c$ = 1620

$\Rightarrow \frac{13b}{5} + b$ = 1620

$\Rightarrow \frac{13b+5b}{5}$ = 1620

$\Rightarrow 18b = 1620 \times 5$

$\Rightarrow b = \frac{1620\times 5}{18}$ = Rs. 450

42. (3) Let total amount be Rs. x.
According to the question,

$\frac{x}{2} + \frac{x}{3} + 1200 = x$

$\Rightarrow x - \frac{x}{2} - \frac{x}{3} = 1200$

$\Rightarrow \frac{6x-3x-2x}{6} = 1200$

$\Rightarrow \frac{x}{6} = 1200 \Rightarrow x = 1200 \times 6$

= Rs. 7200

$\therefore$ A's share = Rs. $\left(\frac{7200}{2}\right)$

= Rs. 3600

43. (4) According to the question,
3A = 4B

$\Rightarrow \frac{A}{4} = \frac{B}{3} \Rightarrow$ A : B = 4 : 3
B's capital is twice C's capital.

$\therefore \frac{B}{C} = \frac{2}{1}$

B : C = 2 : 1

$\therefore$ A : B : C = 4 × 2 : 3 × 2 : 3 × 1
= 8 : 6 : 3

44. (1) A's share = $\frac{2}{9}$ of (B + C)'s share

$\therefore$ (B + C)'s share = $\frac{9}{2}$ A's share

According to the question,

$A + \frac{9A}{2}$ = 770

$\Rightarrow \frac{2A+9A}{2}$ = 770

$\Rightarrow \frac{11A}{2}$ = 770

$\Rightarrow A = \frac{770\times 2}{11}$ = Rs. 140

45. (2) According to the question,
A : B = 3 : 4
B : C = 3.5 : 3
= 7 : 6
$\therefore$ A : B : C
= 3 × 7 : 4 × 7 : 4 × 6
= 21 : 28 : 24
Sum of the terms of ratio
= 21 + 28 + 24 = 73
$\therefore$ Difference between the shares of B and C

= Rs. $\left(\frac{28-24}{73}\right)\times 730$

= Rs. 40

46. (3) Ratio of the equivalent capitals of A and B for 1 month
= (4000 × 8 + 6000 × 4) : (5000 × 9 + 3000 × 3)
= (32000 + 24000) : (45000 + 9000)
= 56000 : 54000 = 28 : 27
Sum of the terms of ratio
= 28 + 27 = 55
A is an active partner.
Allowance got by A in 1 year
= Rs. 1200
Remaining profit
= Rs. (6700 – 1200) = Rs. 5500

$\therefore$ B's share = Rs. $\left(\frac{27}{55}\times 5500\right)$

= Rs. 2700

47. (3) According to the question,
Amount to be distributed in the ratio 7 : 10 : 13
= Rs. (15525 – 22 – 35 – 45)
= Rs. 15420
Sum of the terms of ratio
= 7 + 10 + 13 = 30

Sunil's share= Rs. $\left(\frac{7}{30}\times 15420\right)$

= Rs. 3598
Anil's share

= Rs. $\left(\frac{10}{30}\times 15420\right)$

= Rs. 5140
Jamil's share

= Rs. $\left(\frac{13}{30}\times 15420\right)$

= Rs. 6682
Ratio after respective increase in each share
= (3598 + 22 + 16) : (5140 + 35 + 77) : (6682 + 48 + 37)
= 3636 : 5252 : 6767
= 36 : 52 : 67

48. (1) According to the question,

$\frac{A}{2} = \frac{B}{3} = \frac{C}{6}$

$\therefore$ A : B : C = 2 : 3 : 6
Sum of the terms of ratio
= 2 + 3 + 6 = 11
Total amount = Rs. 1980

$\therefore$ B's share = Rs. $\left(\frac{3}{11}\times 1980\right)$

= Rs. 450

49. (1) Ratio of the equivalent capitals of A, B and C for 1 month
= 13000 × 12 : 17000 × 12 : 5000 × 12
= 13 : 17 : 5
Sum of the terms of ratio
= 13 + 17 + 5 = 35
Total profit = Rs. 1400

$\therefore$ B's share = Rs. $\left(\frac{17}{35}\times 1400\right)$

= Rs. 680

50. (1) According to the question,
A + B + C = 600 .... (i)
and

$$\frac{2A}{5}+40=\frac{2B}{7}+20$$

$$=\frac{9C}{17}+10$$

$$\therefore \frac{2A}{5}+40=\frac{2B}{7}+20$$

$$=\frac{2A}{5}+20=\frac{2}{7}B$$

$$\therefore B=\frac{7}{2}\left(\frac{2A}{5}+20\right)=\frac{7A}{5}+70$$

Again, $\frac{2A}{5}+40=\frac{9C}{17}+10$

$$\Rightarrow \frac{9C}{17}=\frac{2A}{5}+30$$

$$\Rightarrow C=\frac{17}{9}\left(\frac{2A}{5}+30\right)$$

$$=\frac{34A}{45}+\frac{170}{3}$$

$$\therefore A+\frac{7A}{5}+70+\frac{34A}{45}+\frac{170}{3}=600$$

$$\Rightarrow A+\frac{7A}{5}+\frac{34A}{45}=600-70-\frac{170}{3}$$

$$\Rightarrow \frac{45A+63A+34A}{45}$$

$$=530-\frac{170}{3}$$

$$\Rightarrow \frac{142A}{45}=\frac{1590-170}{3}=\frac{1420}{3}$$

$$\Rightarrow A=\frac{1420}{3}\times\frac{45}{142}=\text{Rs. } 150$$

TYPE-XII

1. (3) Let interior angle = I and exterior angle = E
According to questions,

$$\frac{I}{E}=\frac{2}{1}\Rightarrow 2E=I.1 \text{ or, } E=\frac{I}{2}$$

But I + E = 180°

$$I+\frac{I}{2}=180$$

$$\frac{3}{2}I=180$$

$$I=\frac{2}{3}\times 180$$

I = 120°
We know that each interior angle of a regular polygon of n sides is given by

$$I=\frac{n-2}{n}\times 180°$$

$$120°=\frac{n-2}{n}\times 180°$$

$$\Rightarrow \frac{n-2}{n}=\frac{120°}{180°}=\frac{2}{3}$$

$\Rightarrow 3n - 6 = 2n \Rightarrow n = 6$

2. (3) Required answer

$$\frac{6-x}{7-x}<\frac{16}{21}$$

Check through options

$$=\frac{6-3}{7-3}=\frac{3}{4}<\frac{16}{21}$$

3.(3) Let the numbers be 17x and 45x respectively.
According to the question,

$$\frac{1}{5}\text{ of }45x-\frac{1}{3}\text{ of }17x=15$$

$$\Rightarrow 9x-\frac{17x}{3}=15$$

$$\Rightarrow \frac{27x-17x}{3}=15$$

$$\Rightarrow 10x=15\times 3$$

$$\Rightarrow x=\frac{15\times 3}{10}=\frac{9}{2}$$

$\therefore$ The required number

$$=17x=\frac{17\times 9}{2}=\frac{153}{2}=76\frac{1}{2}$$

4. (1) Price of the third variety
= x per kg.
$\therefore$ 126 + 135 + 2x = 4 × 153
$\Rightarrow$ 261 + 2x = 612
$\Rightarrow$ 2x = 612 – 261 = 351

$$\Rightarrow x=\frac{351}{2}=₹\ 175.5$$

5. (4) Given ratio is total members :
absentees = 5 : 3 i.e. $\frac{3}{5}$
Hence, Number of persons absent

$$=\frac{3}{5}\times 15=9$$

6. (3) **Case I,**

$$P:Q:R=\frac{1}{2}:\frac{1}{3}:\frac{1}{4}$$

= 6 : 4 : 3
Case II,
P : Q : R = 2 : 3 : 4
Clearly, R will gain.

7. (1) Ratio of first and second class fares = 3 : 1
Ratio of number of passengers
= 1 : 50
$\therefore$ Ratio of total amount
= 3 × 1 : 1 × 50 = 3 : 50
$\therefore$ Amount collected from second class passengers

$$=₹\left(\frac{50}{53}\times 1325\right)=₹\ 1250$$

8. (1) A : B = 3 : 2 = 9 : 6
B : C = 3 : 2 = 6 : 4
$\therefore$ A : B :C = 9 : 6 : 4
Total runs = 361
$\therefore$ Number of runs scored by A

$$=\frac{9}{(9+6+4)}\times 361$$

$$=\frac{9}{19}\times 361=171$$

9. (1)Let the number of failures = 4x and that of passers = 25 x
$\therefore$ Total number of students = 4x + 25x = 29 x
In case II
Number of students = 29x + 5
Number of failures = 4 x – 2
$\therefore$ Number of passers
= 29x + 5 – 4x + 2 = 25x +7
$\therefore$ According to the question,

$$\frac{25x+7}{4x-2}=\frac{22}{3}$$

$\Rightarrow 88x - 44 = 75x + 21$
$\Rightarrow 88x - 75x = 44 + 21$
$\Rightarrow 13x = 65$

$$\Rightarrow x=\frac{65}{13}=5$$

$\therefore$ Total number of students
= 29x = 29 × 5 = 145

10. (1) Sachin : Sourav = 3 : 2
Sourav : Vinod = 3 : 2
Ratio of the runs scored by Sachin, Sourav and Vinod respectively = 3 × 3 : 2 × 3 : 2 × 2
= 9 : 6 : 4
∴ Runs scored by Sachin

$$= \frac{9}{19} \times 285 = 135$$

11. (3) According to the question,
E + M = 170 ....(i)
E – M = 10 ....(ii)
Adding both the equations,
2E = 180 ⇒ E = 90
From equation (i),
M = 170 – 90 = 80

$$\therefore \frac{E}{M} = \frac{9}{8} = 9 : 8$$

12. (2) Let the initial weights of Mr. Gupta and Mrs. Gupta be $7x$ and $8x$ kg respectively.
$\therefore 7x + 8x = 120$
$\Rightarrow 15x = 120$

$$\Rightarrow x = \frac{120}{15} = 8$$

∴ Mr. Gupta's weight = 7 × 8
= 56 kg
Mrs. Gupta's weight
= 8 × 8 = 64 kg
Let Mrs. Gupta reduce her weight by y kg.

$$\therefore \frac{56-6}{64-y} = \frac{5}{6}$$

$$\Rightarrow \frac{50}{64-y} = \frac{5}{6}$$

$\Rightarrow 64 - y = 60$
$\Rightarrow y = 64 - 60 = 4$ kg

13. (4) Let the original number of boys and girls be $5x$ and $3x$ respectively and that of new boys and girls be $5y$ and $7y$ respectively.
$\therefore 5x + 3x + 5y + 7y = 1200$
$\Rightarrow 2x + 3y = 300$ .....(i)
and,

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

$\Rightarrow 25x + 25y = 21x + 49y$
$\Rightarrow 4x = 24y$
$\Rightarrow x = 6y$ ..... (ii)
From equation (i),
$4x + 6y = 600$
$\Rightarrow 5x = 600 \Rightarrow x = 120$
∴ Original number of students
$= 8x = 960$

14. (3) CP of refrigerator = ₹ $5x$
CP of television = ₹ $3x$
$\therefore 2x = 5500$

$$\Rightarrow x = \frac{5500}{2} = 2750$$

∴ CP of refrigerator
= 5 × 2750 = ₹ 13750

15. (3) According to question,
Son : Daughter : Nephew
= 5x : 4x : x
But 5 sons : 4 daughters : 2 nephews
= 25x : 16x : 2x
and 25x + 16x + 2x = ₹ 8600
43x = ₹ 8600
x = ₹ 200
∴ Required answer
= 4 × 200 = ₹ 800

16. (2) A + B = 158
C = 158 – 101 = 57
Also B = 57 + 23 = 80
∴ The amount with A
= ₹ (158 – 80) = ₹ 78

17. (1) L = N + 5.72
M = L + 2.24
= N + 5.72 + 2.24
M = N + 7.96
L + M + N = 340.68
N + 5.72 + N + 7.96 + N
= 340.68 ⇒ 3N = 327

$$\Rightarrow N = \frac{327}{3} = ₹\ 109$$

18. (4) Ratio of the first and second class fares (total)
= 1 × 4 : 1 × 40
= 4 : 40 = 1 : 10
∴ Amount collected from the first class passengers

$$= \frac{1}{11} \times 1100 = ₹100$$

19. (3) Time taken is inversely proportional to relevant speeds.

$$\therefore \text{Required ratio} = \frac{1}{4} : \frac{1}{3} : \frac{1}{5}$$

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

= 15 : 20 : 12

20. (3) let the numbers be x and y where $x > y$.

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

$$\Rightarrow x = \frac{y}{2} + \frac{5y}{2} = 3y \Rightarrow \frac{x}{y} = \frac{3}{1}$$

21. (2) Let the number of shirts of brand B be x.
Let the cost of a shirt of brand B be ₹ 1.
∴ Original cost = 4 × 2 + x
= ₹ (8 + x)
In case II,

$$4 + 2x = (8 + x) \times \frac{140}{100} = (8 + x)\frac{7}{5}$$

$\Rightarrow 20 + 10x = 56 + 7x$
$\Rightarrow 10x - 7x = 56 - 20 = 36$
$\Rightarrow 3x = 36 \Rightarrow x = 12$
∴ Required ratio
= 4 : 12 = 1 : 3

22. (1) Total students
$= 6x + x = 7x$

$$\therefore \frac{6x+6}{x-6} = \frac{9}{1}$$

$\Rightarrow 6x + 6 = 9x - 54$
$\Rightarrow 9x - 6x = 54 + 6 = 60$
$\Rightarrow 3x = 60 \Rightarrow x = 20$
∴ Total number of students
= 7 × 20 = 140

23. (4) Weight of paper bundles

$$= \left(\frac{22}{25} \times 36\right) \text{ kg}$$

$$= \left(\frac{22 \times 36 \times 1000}{25}\right) \text{ gm}$$

= 31680 gm

24. (2) Numbers = $3x$ and $4x$
$\therefore (4x)^2 = 8 \times (3x)^2 - 224$
$\Rightarrow 16x^2 = 72x^2 - 224$
$\Rightarrow 72x^2 - 16x^2 = 224$

$$\Rightarrow 56x^2 = 224 \Rightarrow x^2 = \frac{224}{56} = 4$$

$\Rightarrow x = \sqrt{4} = 2$
∴ Numbers = 6 and 8

25. (2) If boys = x and girls = y, then

$$y \times \frac{10}{100} = \frac{x}{20} \Rightarrow \frac{y}{10} = \frac{x}{20}$$

$$\Rightarrow \frac{x}{y} = \frac{20}{10} = \frac{2}{1} = 2 : 1$$

26. (3) 5 steps of policeman = 7 steps of thief

$$\therefore \text{8 steps of policeman} = \frac{7}{5} \times 8$$

$$= \frac{56}{5} \text{ steps of thief}$$

$$\therefore \text{Required ratio} = \frac{56}{5} : 10$$

= 56 : 50
= 28 : 25

27. (3) Marks obtained by A in English = $2x$ (let)
Marks obtained in Maths = $3x$
Marks obtained in Science = x
According to the question,
$2x + 3x + x = 180$
$\Rightarrow 6x = 180$
$\Rightarrow x = \frac{180}{6} = 30$
= Marks obtained in science

28. (4) 7 jumps of Tom ≡ 5 jumps of Jerry
$\therefore$ 8 jumps of Tom $\equiv \frac{5}{7} \times 8$
$= \frac{40}{7}$ jumps of Jerry
$\therefore$ Required ratio $= \frac{40}{7} : 6$
= 40 : 42 = 20 : 21

29. (1) Story books $\Rightarrow$ 1512
Other books $\Rightarrow \frac{2}{7} \times 1512$
= 432
Additional story books = x
$\therefore \frac{1512 + x}{432} = \frac{15}{4}$
$\Rightarrow 6048 + 4x = 432 \times 15 = 6480$
$\Rightarrow 4x = 6480 - 6048 = 432$
$\Rightarrow x = \frac{432}{4} = 108$

30. (2) Time taken by P in covering 300 metre
$= \frac{300}{3} = 100$ seconds
Distance covered by Q in 100 seconds
= 5 × 100 = 500 metre
So, both reach at the same time.

31. (1) In the school,
Boys $\Rightarrow \frac{4}{7} \times 1554 = 888$
Girls $\Rightarrow \frac{3}{7} \times 1554 = 666$
After 30 days,
Girls = 666 + 30 = 696
If x boys leave the school, then,
According to the question,
$\frac{888 - x}{696} = \frac{7}{6}$
$\Rightarrow \frac{888 - x}{116} = 7$
$\Rightarrow 888 - x = 116 \times 7 = 812$
$\Rightarrow x = 888 - 812 = 76$

32. (2) $\frac{r_1}{r_2} = \frac{2}{3}$ and $\frac{h_1}{h_2} = \frac{5}{3}$
$\therefore$ Ratio of volumes of cylinders
$= \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2}$
$= \left(\frac{r_1}{r_2}\right)^2 \times \frac{h_1}{h_2}$
$= \left(\frac{2}{3}\right)^2 \times \frac{5}{3} = \frac{20}{27}$

33. (3) Tickets of type A $\Rightarrow 3x$
Tickets of type B $\Rightarrow 2x$
Tickets of type C $\Rightarrow 5x$
According to the question,
$(3x \times 1000 + 2x \times 500 + 5x \times 200)$
$= 2.5 \times 10000000$
$\Rightarrow 30x + 10x + 10x = 250000$
$\Rightarrow 50x = 250000$
$\Rightarrow x = 5000$
Total number of tickets sold = $10x$
$= 10 \times 5000 = 50000$

34. (2) Total working hours of office = From 10 a.m. to 5 p.m.
= 7 hours
Lunch interval = 30 minutes
$\therefore$ Required ratio = 30 minutes : 7 hours
= 30 minutes : (7 × 60) minutes
= 1 : 14

35. (3) Ratio of the railway fares of airconditioned and ordinary sleeper classes = 4 : 1
Ratio of the corresponding number of passengers = 3 : 25
Corresponding compound ratio = 4 × 3 : 1 × 25
= 12 : 25
Sum of the terms of ratio
= 12 + 25 = 37
$\therefore$ Total fare of the passengers of airconditioned sleeper classes = Rs. $\left(\frac{12}{37} \times 37000\right)$
= Rs. 12000

36. (1) According to the question,
$\frac{(x-1)(x+1)}{(x+1)(x+2)} = \frac{5}{6}$
$\Rightarrow \frac{x-1}{x+2} = \frac{5}{6}$
$\Rightarrow 6x - 6 = 5x + 10$
$\Rightarrow 6x - 5x = 10 + 6$
$\Rightarrow x = 16$

37. (4) Let the C.P. be Rs. $4x$.
Its S.P. = Rs. $5x$.
Profit = Rs. $(5x - 4x)$ = Rs. x.
$\therefore$ Profit per cent $= \frac{x}{4x} \times 100$
= 25%

38. (3) Let the C.P. of article be Rs. x and marked price be Rs. y.
According to the question,
80% of y = 115% of x
$\Rightarrow y \times \frac{80}{100} = \frac{x \times 115}{100}$
$\Rightarrow 80y = 115x$
$\Rightarrow \frac{x}{y} = \frac{80}{115} = \frac{16}{23}$

39. (3) Rate of working
$\times \frac{1}{\text{Time taken}}$
$\therefore$ Ratio of days taken
$= \frac{1}{2} : \frac{1}{3} = 3 : 2$

40. (1) In selection process,
Selected candidates = $3x$
Unselected candidates = x
According to the question,
In case II,
Total applicants = $4x - 80$
Selected candidates = $3x - 40$
Unselected candidates
$= (4x - 80) - (3x - 40)$
$= 4x - 80 - 3x + 40$
$= x - 40$
$\therefore \frac{3x - 40}{x - 40} = \frac{4}{1}$
$\Rightarrow 4x - 160 = 3x - 40$
$\Rightarrow 4x - 3x = 160 - 40$
$\Rightarrow x = 120$
$\therefore$ Required total applicants
$= 4x = 4 \times 120 = 480$

41. (1) Let the number of the selected candidates be $4x$
Unselected candidates = x
According to the question,
Total new applicants = $5x - 90$
Selected candidates = $4x - 20$
Unselected candidates
$= 5x - 90 - 4x + 20$
$= x - 70$
$\therefore \frac{4x - 20}{x - 70} = \frac{5}{1}$
$\Rightarrow 5x - 350 = 4x - 20$
$\Rightarrow 5x - 4x = 350 - 20$
$\Rightarrow x = 330$
$\therefore$ Required number of total original applicants
$= 5x = 5 \times 330 = 1650$

❑❑❑

TEST YOURSELF

1. The sum of the squares of two positive numbers is greater than their product by 28. If the ratio of the numbers 2 : 3, find the numbers.

(1) 4 and 6 (2) 6 and 9

(3) 8 and 12 (4) None of these

2. 3 litres of a mixture containing wine and water in the ratio 3 : 7 and 4 litres of another mixture containing wine and water in the ratio 3 : 5 are mixed together. What is the ratio of wine and water in the resulting mixture ?

(1) 11 : 23 (2) 12 : 23

(3) 13 : 24 (4) 12 : 27

3. When the market price per kg of rice and wheat be in the ratio 3 : 2, the monthly expenses of a family towards rice and wheat are in the ratio 5 : 6. If the market price of rice and wheat becomes in the ratio 4 : 3, what will be the ratio of expenses towards them ? (Assume that amount of rice and wheat consumed remains unaltered.)

(1) 20 : 29 (2) 20 : 27

(3) 18 : 25 (4) 21 : 37

4. Three vessels of equal volumes contain water and syrup in the ratio 4 : 1, 5 : 2 and 7 : 3 respectively. When they are thoroughly mixed together in a large vessel, find the resulting ratio of water and syrup in the mixture. (Assume that in the mixture total volume remains unaltered).

(1) 11 : 30 (2) 19 : 11

(3) 31 : 11 (4) 11 : 35

5. A, B and C go into a business as partners with the agreement that their shares of profit will be in the proportion of their capitals. If A's capital : B's capital = 2: 3, and B's capital : C's capital = 2 : 5, find their shares in a profit of Rs. 3250.

(1) Rs. 520, Rs. 780, Rs. 1950

(2) Rs. 540, Rs. 760, Rs. 1950

(3) Rs. 540, Rs. 780, Rs. 1930

6. One morning after purchasing 6 litres of milk from a milk man, a householder found that the weight of this quantity of milk was 6.144 kg. If one litre of the pure milk weighs 1.032 kg and that of one litre of the pure water 1 kg. then how much water was added to milk ?

(1) 0.5 kg (2) 1.2 kg

(3) 0.05 kg (4) 1.5 kg

7. 5 men, 6 women and 7 boys finished a work in 3 days and got the remuneration of Rs. 2137.50 for it. If the work of 1 man, 1 woman, and 1 boy in one day be in the proportion of $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$, what sum did each man get on a day ?

(1) Rs. 196 (2) Rs. 197

(3) Rs. 198 (4) Rs. 199

8. Twenty years ago the ratio between the ages of Sita and Meena was 1 : 4 and at present it is 1 : 2. What is the age of Sita at present?

(1) 25 (2) 35

(3) 30 (4) None of these

9. A mixture contains alcohol and water in the ratio 4 : 3. If 5 litres of water is added to the mixture the ratio becomes 4 : 5. The quantity of alcohol in the given mixture is :

(1) 12 litres (2) 10 litres

(3) 14 litres (4) 16 litres

10. If $x : y = 8 : 9$, then $5x - 4y : 3x + 2y$ is equal to :

(1) 2 : 19 (2) 3 : 17

(3) 2 : 21 (4) None of these

11. Determine the fourth proportional to 9.6 m 7.2 m 28.8 m.

(1) 22.6 m. (2) 21.6 m.

(3) 23.6 m. (4) 20.6 m.

12. Find the mean proportional between 100 and 625.

(1) 350 (2) 225

(3) 250 (4) 275

13. Find the third proportional between 9 and 27.

(1) 36 (2) 54

(3) 27 (4) 81

14. If $A : B = 3 : 4$, $B : C = 8 : 10$ and $C : D = 15 : 17$, then find $A : B : C : D$.

(1) 9 : 12 : 15 : 17

(2) 9 : 15 : 12 : 17

(3) 9 : 17 : 12 : 15

(4) 9 : 15 : 17 : 12

15. If $A : B = 1 : 2$, $B : C = 3 : 4$, $C : D = 2 : 3$ and $D : E = 3 : 4$, then find $A : B : C : D : E$.

(1) 3 : 8 : 6 : 12 : 16

(2) 3 : 6 : 8 : 12 : 16

(3) 3 : 16 : 6 : 8 : 12

(4) 3 : 12 : 6 : 8 : 16

16. If $(2x + 3) : (5x - 38)$ be the duplicate ratio of $\sqrt{5} : \sqrt{6}$. Find the value of x.

(1) 8 (2) 32

(3) 16 (4) 18

17. If $(3x - 7) : (4x + 3)$ is sub-triplicate ratio of 8 : 27, find the value of x.

(1) 9 (2) 54

(3) 18 (4) 27

18. If $\frac{x}{y} = \frac{2}{5}$ find the ratio of $9x + 6y : 5x + 3y$.

(1) $\frac{48}{25}$ (2) $\frac{25}{48}$

(3) $\frac{3}{13}$ (4) $\frac{12}{25}$

19. What must be added to each term of the ratio 7 : 13, so that the ratio becomes 2 : 3.

(1) 4 (2) 5

(3) 6 (4) 7

20. What must be added to the numbers 10, 20, 30 and 50 so that the sums are proportional?

(1) 15 (2) 12

(3) 10 (4) 8

21. The ratio between two numbers is 3 : 4. If their LCM is 120, find the numbers.

(1) 35 and 40 (2) 25 and 35

(3) 25 and 30 (4) 30 and 40

22. If b is the mean proportional between a and c, then $\frac{a^2 - b^2 + c^2}{a^{-2} - b^{-2} + c^{-2}} = ?$

(1) b^4 (2) $2b^2$
(3) $2b^3$ (4) $2b$

23. $\frac{4a+9b}{4a-9b} = \frac{4c+9d}{4c-9d}$ then $\frac{a}{b} = ?$

(1) $\frac{c^2}{d}$ (2) $\frac{c}{d}$
(3) $\frac{-2c}{d}$ (4) $\frac{c}{2d}$

24. If $P = \frac{4xy}{x+y}$, find the value of $\frac{P+2x}{P-2x} + \frac{P+2y}{P-2y}$.

(1) 4 (2) 1
(3) 2 (4) 6

25. A shopkeeper mixes 12 kgs of rice at ₹ 8 per kg with 6 kgs of rice at ₹ 10 per kg. Find the cost per kg of the mixture.

(1) ₹ 8.67 (2) ₹ 8.50
(3) ₹ 7.67 (4) ₹ 7.50

26. In what ratio a trader should mix two varieties of tea one at ₹ 62 per kg and other at ₹ 72 per kg in order to obtain the mixture worth ₹ 65 per kg ?

(1) 4 : 3 (2) 7 : 3
(3) 8 : 3 (4) 3 : 8

27. In what proportion may three kinds of tea prices at ₹ 80, ₹ 70 and ₹ 50 per kg be mixed to produce a mixture worth ₹ 60 per kg?

(1) 2 : 2 : 3 (2) 2 : 1 : 3
(3) 1 : 2 : 3 (4) 1 : 1 : 3

28. In what proportion may three kinds of rice bought at ₹ 6, ₹ 10 and ₹ 14 be mixed to produce a mixture which would earn 40% on selling it at ₹ 11.20 per kg?

(1) 4 : 1 : 1 (2) 3 : 1 : 1
(3) 2 : 1 : 1 (4) 2 : 2 : 1

29. Find the proportion in which three types of sugar at ₹ 12, ₹ 14 and ₹ 20 may be mixed so as to obtain a mixture worth ₹ 15 per kg?

(1) 15 : 5 : 6 (2) 5 : 15 : 6
(3) 3 : 12 : 16 (4) 4 : 12 : 15

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

(1) 1 : 3 (2) 2 : 3
(3) 2 : 1 (4) 3 : 2

31. Two vessels A and B contain mixtures of milk and water in the ratios 4 : 1 and 9 : 11 respectively. They are mixed in the ratio of 3 : 2. Find the ratio of milk and water in the resulting mixture.

(1) 12 : 25 (2) 15 : 37
(3) 17 : 19 (4) 33 : 17

32. A person has two solutions of sugar with 30% and 50% concentration respectively. In what ratio should he mix two solutions to get 45% concentration in the resulting mixture ?

(1) 1 : 3 (2) 2 : 3
(3) 2 : 5 (4) 5 : 2

33. 49 litres of milk has 80% milk concentration. How much water be added to make its concentration 70% ?

(1) 6 litres (2) 7 litres
(3) 6.5 litres (4) 7.5 litres

34. 6 litres of milk and water mixture has 75% milk in it. How much milk should be added to the mixture to make it 90% pure ?

(1) 10 litres (2) 8 litres
(3) 9 litres (4) 12 litres

35. 12 litres of a mixture has wine and water in the ratio 2 : 3. How much water must be added to get wine to water ratio of 3 : 7 in the resultant mixture ?

(1) 4.5 litres (2) 3.5 litres
(3) 3 litres (4) 4 litres

36. 55 litres of a mixture has milk and water in the ratio 7 : 4. How much water must be added to get milk and water in the ratio 7 : 6 in the resulting mixture.

(1) 16 litres (2) 15 litres
(3) 12 litres (4) 10 litres

SHORT ANSWERS

1. (1)	**2.** (2)	**3.** (2)	**4.** (3)
5. (1)	**6.** (3)	**7.** (2)	**8.** (3)
9. (2)	**10.** (3)	**11.** (2)	**12.** (3)
13. (4)	**14.** (1)	**15.** (2)	**16.** (3)
17. (4)	**18.** (1)	**19.** (2)	**20.** (3)
21. (4)	**22.** (1)	**23.** (2)	**24.** (3)
25. (1)	**26.** (2)	**27.** (4)	**28.** (1)
29. (2)	**30.** (3)	**31.** (4)	**32.** (1)
33. (2)	**34.** (3)	**35.** (4)	**36.** (4)

EXPLANATIONS

1. (1) Let the numbers be $2x$ and $3x$.

$\therefore (3x)^2 + (2x)^2 - 2x \times 3x = 28$

$\Rightarrow 13x^2 - 6x^2 = 28$

$\Rightarrow 7x^2 = 28$

$\Rightarrow x^2 = \frac{28}{7}$; 4

$\Rightarrow x = \sqrt{4} = 2$

$\therefore$ Numbers are : 4 and 6

2. (2) In 3 litres of mixture,

Wine = $\frac{3}{10} \times 3$; $\frac{9}{10}$ litre

Water = $\frac{7}{10} \times 3$; $\frac{21}{10}$ litre

In 4 litres of mixture,

Wine = $\frac{3}{8} \times 4$; $\frac{3}{2}$ litres

Water = $\frac{5}{8} \times 4$; $\frac{5}{2}$ litres

In resulting mixture,
Wine : Water

$= \left(\frac{9}{10}\right)\frac{3}{2} : \left(\frac{21}{10}\right)\frac{5}{2}$

= 24 : 46 = 12 : 23

3. (2) Market price per kg :
Rice = Rs. $3x$
Wheat = Rs. $2x$
Monthly expenses :
Rice = Rs. $5y$

Wheat = Rs. $6y$

Amount of rice = $\frac{5y}{3x}$ kg

Amount of wheat = $\frac{6y}{2x}$ kg

New price :
Rice = Rs. $4z$/kg
Wheat = Rs. $3z$/kg
$\therefore$ Required ratio

$= \frac{5y \times 4z}{3x} : \frac{6y}{2x} \times 3z$

$= \frac{20}{3} : \frac{18}{2}$

$= 20 : 27$

4. (3) Let the capacity of each vessel be x litres.
$\therefore$ Ratio

$= \left(\frac{4x}{5}, \frac{5x}{7}, \frac{7x}{10}\right) :$

$\left(\frac{x}{5}, \frac{2x}{7}, \frac{3x}{10}\right)$

$= \frac{56x, 50x, 49x}{70} :$

$\frac{14x, 20x, 21x}{70}$

$= \frac{155x}{70} : \frac{55x}{70} = 31 : 11$

5. (1) A : B = 2 : 3 = 4 : 6
B : C = 2 : 5 = 6 : 15
A : B : C = 4 : 6 : 15
A + B + C = 4 + 6 + 15 = 25

A's share = $\frac{4}{25} \times 3250$

= Rs. 520

B's share = $\frac{6}{25} \times 3250$

= Rs. 780

C's share = $\frac{15}{25} \times 3250$

= Rs. 1950

6. (3) Weight of 1 kg of impure milk

; $\frac{6.144}{6}$ = 1.024 kg

Weight of water

$= 6 - \frac{1.024}{1.032} \times 6$

$= 6 - 5.95$

$= 0.05$ kg

7. (2) Ratio of wages of 1 man, 1 woman and 1 boy

$= \frac{1}{2} : \frac{1}{3} : \frac{1}{4} = 6 : 4 : 3$

Each man's wages

$= \frac{6}{13} \times \frac{2137.5}{5} \neq$ Rs. 197

8. (3) 20 years ago,
Sita's age = x years
Meena's age = $4x$ years

$\therefore \frac{x, 20}{4x, 20} ; \frac{1}{2}$

$\Rightarrow 2x + 40 = 4x + 20$
$\Rightarrow 2x = 20 \Rightarrow x = 10$
$\therefore$ Sita's present age = 30 years

9. (2) $\frac{4x}{3x, 5} ; \frac{4}{5}$

$\Rightarrow 20x = 12x + 20$
$\Rightarrow 8x = 20 \Rightarrow x = 2.5$
$\therefore$ Quantity of alcohol
$= 4 \times 2.5 = 10$ litres

10. (3) $\frac{x}{y} ; \frac{8}{9}$ (Given)

$\therefore \frac{5x + 4y}{3x, 2y} ; \frac{5\frac{x}{y} + 4}{3\frac{x}{y}, 2}$

$; \frac{5 \times \frac{8}{9} + 4}{3 \times \frac{8}{9}, 2}$

$; \frac{40 + 36}{24, 18} ; \frac{4}{42} ; \frac{2}{21}$

11. (2) Let the fourth proportional be x.
$\therefore$ 9.6 kg : 7.2 kg. : : 28.8 m : x m
or, 9.6 : 7.2 : : 28.8 : x

Then, $\frac{9.6}{7.2} = \frac{28.8}{x}$

$\Rightarrow 9.6 \times x = 7.2 \times 28.8$

$\Rightarrow x = \frac{7.2 \times 28.8}{9.6} = 21.6m$

12. (3) Let the mean proportional be x.
$\therefore$ 100 : x : x : 625

Then, $\frac{100}{x} = \frac{x}{625}$

$\Rightarrow x^2 = 100 \times 625$

$\Rightarrow x = \sqrt{100 \times 625} = 10 \times 25$

$= 250$

13. (4) Let the third proportional be x.
Since the third proportional to 9 and 27 is the same as fourth proportional to 9, 27, 27
$\therefore$ 9 : 27 : : 27 : x

$\therefore \frac{9}{27} = \frac{27}{x}$

$\Rightarrow 9 \times x = 27 \times 27$

$\Rightarrow x = \frac{27 \times 27}{9} = 81$

14. (1) $A : B = 3 : 4$ $B : C = 8 : 10$
$C : D = 15 : 17$
$\therefore A : B : C : D = 3 \times 8 \times 15 : 4 \times 8 \times 15 : 4 \times 10 \times 15 : 4 \times 10 \times 17 = 9 : 12 : 15 : 17$

15. (2) $A : B = 1 : 2$
$B : C = 3 : 4$
$C : D = 2 : 3$
$D : E = 3 : 4$
$\therefore A : B : C : D : E$
$= 1 \times 3 \times 2 \times 3 : 2 \times 3 \times 2 \times 3 : 2 \times 4 \times 2 \times 3 : 2 \times 4 \times 3 \times 3 : 2 \times 4 \times 3 \times 4 = 3 : 6 : 8 : 12 : 16$

16. (3) Since $(2x + 3) : (5x - 38)$ is the duplicate ratio of $\sqrt{5} : \sqrt{6}$, therefore

$\frac{2x+3}{5x-38} = \left(\frac{\sqrt{5}}{\sqrt{6}}\right)^2$

$\Rightarrow \frac{2x+3}{5x-38} = \frac{5}{6}$

$\Rightarrow 6(2x + 3) = 5(5x - 38)$
$\Rightarrow 12x + 18 = 25x - 190$
$\Rightarrow 25x - 12x = 18 + 190$
$\Rightarrow 13x = 208$

$\Rightarrow x = \frac{208}{13} = 16$

17. (4) Since $(3x - 7) : (4x + 3)$ is the sub-triplicate ratio of 8 : 27, therefore,

$\frac{3x-7}{4x+3} = 3\sqrt{\frac{8}{27}} = \frac{2}{3}$

$\Rightarrow 3(3x - 7) = 2(4x + 3)$
$\Rightarrow 9x - 21 = 8x + 6$
$\Rightarrow 9x - 8x = 21 + 6$
$\Rightarrow x = 27$

18. (1) We have, $\frac{x}{y}=\frac{2}{5}$

$\therefore 9x + 6y : 5x + 3y = \frac{9x+6y}{5x+3y}$

$=\frac{9\frac{x}{y}+6}{5\frac{x}{y}+3}$

$\left(\begin{matrix}\text{On dividing Numerator}\\ \text{and Denominator by } y\end{matrix}\right)$

$=\frac{9\times\frac{2}{5}+6}{5\times\frac{2}{5}+3}=\frac{\frac{18+30}{5}}{2+3}$

$=\frac{48}{5\times5}=\frac{48}{25}$

19. (2) Let x be added to each term.

Then, $\frac{7+x}{13+x}=\frac{2}{3}$

$\Rightarrow 3(7 + x) = 2(13 + x)$

$\Rightarrow 21 + 3x = 26 + 2x$

$\Rightarrow 3x - 2x\ \ 26 - 21$

$\Rightarrow x = 5$

$\therefore$ 5 must be added to each term.

20. (3) Let x be added in each number to make them proportional.

$\therefore 10 + x : 20 + x :: 30 + x : 50 + x$

Then, $\frac{10+x}{20+x}=\frac{30+x}{50+x}$

$\Rightarrow (10 + x)(50 + x)$
$= (20 + x)(30 + x)$

$\Rightarrow 500 + 50x + 10x + x^2$
$= 600 + 20x + 30x + x^2$

$\Rightarrow 500 + 60x + x^2$
$= 600 + 50x + x^2$

$\Rightarrow 60x - 50x = 600 - 500 = 100$

$\Rightarrow 10x = 100$

$\Rightarrow x=\frac{100}{10}=10$

21. (4) Let the numbers be $3x$ and $4x$.

Then, LCM of $3x$ and $4x$
$= 3 \times 4 \times x = 12x$

$\therefore 12x = 120$

$\Rightarrow x = 10$

So the numbers are $3x$
$= 3 \times 10 = 30$ and,
$4x = 4 \times 10 = 40$

22. (1) Here b is the mean proportional between a and c.

$\therefore a : b :: b : c$

$\Rightarrow \frac{a}{b}=\frac{b}{c} \Rightarrow b^2 = ac$

Now, $\frac{a^2-b^2+c^2}{a^{-2}-b^{-2}+c^{-2}}$

$=\frac{a^2-b^2+c^2}{\frac{1}{a^2}-\frac{1}{b^2}+\frac{1}{c^2}}$

$=\frac{a^2-ac+c^2}{\frac{1}{a^2}-\frac{1}{ac}+\frac{1}{c^2}}$

$=\frac{a^2-ac+c^2}{\frac{c^2-ac+a^2}{a^2c^2}}$

$=\frac{\left(a^2-ac+c^2\right)a^2c^2}{c^2-ac+a^2}=a^2c^2$

$= (ac)^2 = (b^2)^2 = b^4$

23. (2) Here, $\frac{4a+9b}{4a-9b}=\frac{4c+9d}{4c-9d}$

On applying componendo and dividendo, we have

$\frac{4a+9b+4a-9b}{4a+9b-4a+9b}$

$=\frac{4c+9d+4c-9d}{4c+9d-4c+9d}$

$\Rightarrow\frac{8a}{18b}=\frac{8c}{18d} \Rightarrow \frac{a}{b}=\frac{c}{d}$

24. (3) We have

$P=\frac{4xy}{x+y}=\frac{2x\times2y}{x+y}$

$\Rightarrow \frac{P}{2x}=\frac{2y}{x+y}$

and, $\frac{P}{2y}=\frac{2x}{x+y}$

Now, $\frac{P}{2x}=\frac{2y}{x+y}$

On applying componendo and dividendo, we have

$\frac{P+2x}{P-2x}=\frac{2y+x+y}{2y-x-y}$

$=\frac{x+3y}{y-x}$ ...(i)

Again, $\frac{P}{2y}=\frac{2x}{x+y}$

$\Rightarrow \frac{P+2y}{P-2y}=\frac{2x+x+y}{2x-x-y}$

$=\frac{3x+y}{x-y}$ ...(ii)

(i) and (ii)

$\frac{P+2x}{P-2x}+\frac{P+2y}{P-2y}$

$=\frac{x+3y}{y-x}+\frac{3x+y}{x-y}$

$=\frac{3x+y}{x-y}+\frac{x+3y}{y-x}$

$=\frac{3x+y}{x-y}-\frac{x+3y}{x-y}$

$=\frac{3x+y-x-3y}{x-y}$

$=\frac{2x-2y}{x-y}=2$

25. (1) Total quantity of the mixture
$= 12 + 6 = 18$ kgs.

Cost of 12 kgs of rice at ₹ 8 per kg = ₹ (12×8) = ₹ 96

Cost of 6 kgs of rice at ₹ 10 per kg
= ₹ (6×10) = ₹ 60

$\therefore$ Total cost of 18 kgs of the mixture
= ₹ (96 + 60) = ₹ 156

$\therefore$ Cost per kg of the mixture

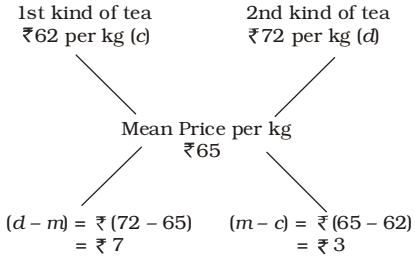
$=\frac{\text{Rs. } 156}{18 \text{ kgs}}$; ₹ 8.67 per kg

[Because cost of the mixture lies somewhere in the middle of ₹ 8 and ₹ 10, so this type of problem is known as **'Alligation medial'**].

26. (2) C.P. of 1 kg tea of Ist quality = ₹ 62

C.P. of 1 kg tea of 2nd quality = ₹ 72.

Mean Price = ₹ 65



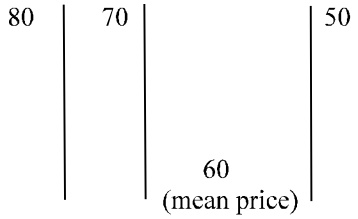
Using Alligation Rule,

$$\frac{\text{Quantity of 1st tea}}{\text{Quantity of 2nd tea}} : \frac{d-m}{m-c} : \frac{7}{3}$$

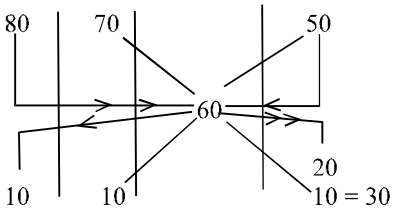
Therefore, they must be mixed in the ratio of 7 : 3.

[Since this problem is the inverse of above type problem, it is called **'Alligation alternate'**].

27. (4) Write the prices in ascending or descending order as shown below :



Make pairs by choosing one from each side of the mean price and apply Alligation Rule. Then add the quantity obtained under each price. This will give the ratio in which the ingredients should be mixed.



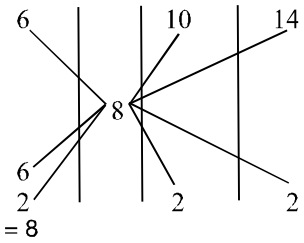
So, Required ratio = 10 : 10 : 30 or 1 : 1 : 3.

28. (1) SP of mixture = ₹ 11.20 per kg.

Profit = 40%.

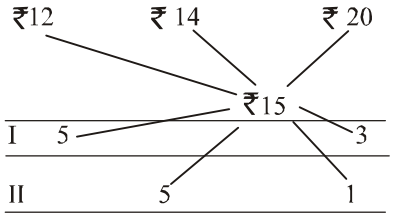
CP of mixture ; $11.20'' \frac{100}{140}$

= ₹ 8 per kg.



Required ratio = 8 : 2 : 2 or 4 : 1 : 1.

29. (2)



Required proportion= 5 : 5 : (3 + 1) or 5 : 5 : 4.

Note : We can find other alternatives too by adding multiples of the quantities obtained at I and II. This will give us infinite number of alternatives. Care must be taken not to mix up quantities of one pair with another.

For example,

(*i*)

I	5		3
II		(5×2)	(1×2)
	5	10	5

= 5 : 10 : 5 = 1 : 2 : 1

(*ii*)

I	5×2		3×2
II		5	1
	10	5	7

= 10 : 5 : 7

(*iii*)

I	5		3
II		5×3	1×3
	5	15	6

= 5 : 15 : 6

30. (3) First of all we write the fraction of milk present in three mixtures.

Mixture *A*.

Ratio of milk and water = 7 : 5.

Sum of the ratios = 7 + 5 = 12

$\therefore$ Fraction of milk = $\frac{7}{12}$

Similarly,

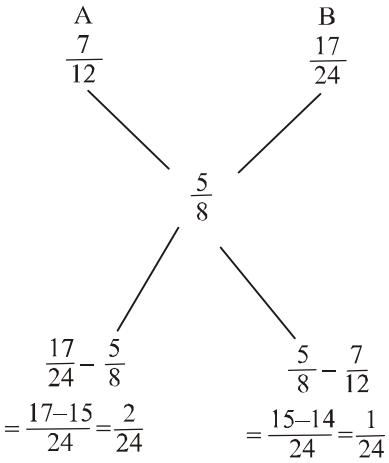
In mixture *B*,

Fraction of milk = $\frac{17}{24}$

In combination of *A* and *B*,

Fraction of milk = $\frac{5}{8}$

We now apply Alligation Rule on these fractions.



$\therefore$ Ratio of *A* & *B*

$= \frac{2}{24} : \frac{1}{24}$; 2 : 1.

31. (4) First of all we write the fraction of milk and water in each mixture.

	Milk	Water
A	$\frac{4}{5}$	$\frac{1}{5}$
B	$\frac{9}{20}$	$\frac{11}{20}$

Both A and B are mixed in the ratio 3 : 2.

$\therefore$ $(3A + 2B)$ will have ratio of milk and water as follows :

Milk : Water = $\left(3\frac{4}{5}\right)\frac{2\frac{9}{20}}{}$:

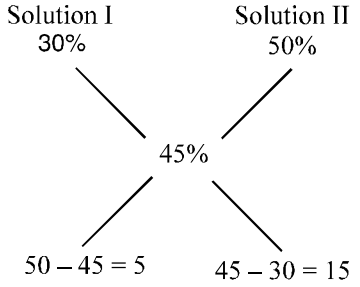
$\left(3\frac{1}{5}\right)\frac{2\frac{11}{20}}{}$

$= \left(\frac{12}{5}\right)\frac{9}{10} : \left(\frac{3}{5}\right)\frac{11}{10}$

$= \frac{33}{10} : \frac{17}{10}$; 33 : 17

So, ratio of milk and water in the resulting mixture = 33 : 17

32. (1)



$\therefore \frac{\text{30\% Concentrated Solution}}{\text{50\% Concentrated Solution}}$

; $\frac{5}{15}$; $\frac{1}{3}$

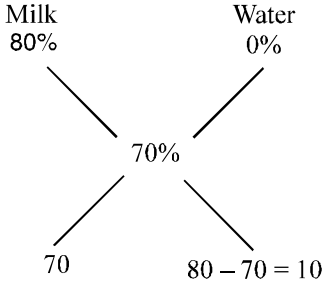
Hence, the required ratio = 1 : 3

33. (2) The given milk has 80% concentration of milk.

Water to be added has 0% milk concentration.

Final concentration of solution is 70%.

By Alligation Rule,



So, water should be added to the given milk in the ratio 10 : 70 or 1 : 7.

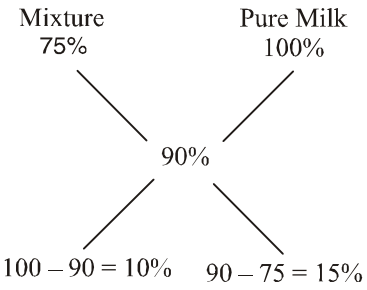
$\therefore$ Quantity of water to be added

$= \frac{1}{7}\text{"}\ 49\ ;\ 7$ litres

34. (3) The given solution has 75% milk.

Milk to be added has 100% milk.

By Alligation Rule



Ratio = 10 : 15 = 2 : 3

$\therefore$ Milk should be added to the given mixture in the ratio 3 : 2.

$\therefore$ Quantity of milk to be added

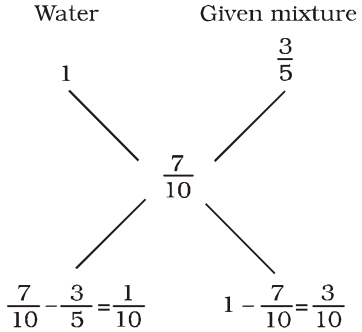
$= \frac{3}{2}\text{"}\ 6\ ;\ 9$ litres.

35. (4) In the given mixture, wine : water = 2 : 3

Fraction of water in the given mixture = $\frac{3}{5}$

For water to be added, fraction = 1

Fraction of water in the resultant mixture = $\frac{7}{10}$



So, water must be added to the mixture in the ratio 1 : 3.

Quantity of water to be added

$= \frac{1}{3}\text{"}\ 12\ ;\ 4$ litres.

36. (4) Milk : Water = 7 : 4

Sum of the ratios = 7 + 4 = 11

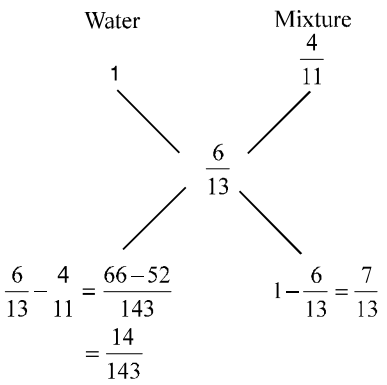
$\therefore$ Fraction of water in the given mixture = $\frac{4}{11}$.

For water to be added, fraction = 1.

Similarly,

Fraction of water in the resulting mixture = $\frac{6}{13}$.

By Alligation Rule.



So, water must be added to the mixture in the ratio $\frac{14}{143} : \frac{7}{13}$

$= \frac{2}{11} : 1$ = 2 : 11.

$\therefore$ Quantity of water to be added

$= \frac{2}{11}\text{"}\ 55\ ;\ 10$ litres.

□□□