RATIO & PROPORTION
SHORT TRICKS &
QUESTIONS WITH
SOLUTIONS

BY

GOVERNMENTADDA.COM
PLEASE SUPPORT US BY JOINING BELOW GROUPS AND LIKE OUR PAGES WE WILL BE VERY THANKFUL TO YOU.

1. Facebook Page: https://www.facebook.com/governmentadda/
2. Facebook Group: https://www.facebook.com/groups/governmentadda/
3. Telegram Channels:
   1. Official Channel: https://telegram.me/GovtAdda
   2. Job Alert Channel: https://telegram.me/jobalert
   3. English Novels Channel: https://telegram.me/EnglishNovelsZone
   4. English Learning Channel: https://telegram.me/EnglishDose
   5. Gk Gs Channel: https://telegram.me/GA_Buzz
4. Telegram Groups:
   1. Banking - https://telegram.me/IbpsZone
   2. SSC - https://telegram.me/SscAdda
   3. RBI - https://telegram.me/RbiZone
   4. Railways - https://telegram.me/RailwayZone
   5. IT Officer - https://telegram.me/IT_Officer
   6. Insurance - https://telegram.me/InsuranceZone
   7. SBI - https://telegram.me/SbiZone
5. Twitter Page: https://twitter.com/GovtAdda
6. Instagram Page: https://www.instagram.com/governmentadda/

Website: https://www.GovernmentAdda.com
Ratio & Proportion is very important for all competitive exams generally 1-2 questions comes from this topic in maximum exams. So we are here providing you the concepts and important short tricks to solve Ratio & Proportion in very fast and efficient way. At the end we will provide few practice questions also apply the trick on those and see that you have got the trick or not.

Here we are providing some cases of Ratio & Proportion and tricks to solve it. Hope this would be helpful to all aspirants.

Ratio and proportion shortcuts

**Hint 1:**

a/b is the ratio of a to b. That is a:b

**Hint 2:**

When two ratios are equal, they are said to be in proportion.

**Example:**

If a:b = c:d, then a,b,c & d are proportion.

**Hint 3:**

Cross product rule in proportion:

Product of extremes = Product of means.

**Example:**

Let us consider the proportion a:b = c:d

Extremes = a & d, means = b & c

Then, as per the cross product rule, we have

ad = bc

**Hint 4:**

Inverse ratios:

b:a is the inverse ratio of a:b and vice versa.

That is, a:b & b:a are the two ratios inverse to each other.

**Hint 5:**

Verification of inverse ratios:

If two ratios are inverse to each other, then their product must be 1.

That is, a:b & b:a are two ratios inverse to each other.

Then, (a:b)X(b:a) = (a/b)X(b/a) = ab/ab = 1

**Hint 6:**

If the ratio of two quantities is given and we want to get the original quantities, we have to multiply both the terms of the ratio by some constant, say “x”.

**Example:**

The ratio of earnings of two persons is 3:4.

Then,

the earning of the first person = 3x

the earning of the second person = 4x
**Hint 7:**

If we want to compare any two ratios, first we have to express the given ratios as fractions.

Then, we have to make them to be like fractions.

That is, we have to convert the fractions to have same denominators.

*Example:*

Compare: 3:5 and 4:7.

First, let us write the ratios 3:5 and 4:7 as fractions.

That is \( \frac{3}{5} \) and \( \frac{4}{7} \).

The above two fractions do not have the same denominators. Let us make them to be same.

For that, we have to find L.C.M of the denominators (5,7).

That is, \( 5 \times 7 = 35 \). We have to make each denominator as 35.

Then the fractions will be \( \frac{21}{35} \) and \( \frac{20}{35} \).

Now compare the numerators 21 and 20.

21 is greater.

So the first fraction is greater.

Hence the first ratio 3:5 is greater than 4:7.

**Hint 8:**

If two ratios \( P:Q \) and \( Q:R \) are given and we want to find the ratio \( P:Q:R \), we have to do the following steps.

First find the common term in the given two ratios \( P:Q \) and \( Q:R \). That is \( Q \).

In both the ratios try to get the same value for “\( Q \)”.

After having done the above step, take the values corresponding to \( P, Q, R \) in the above ratios and form the ratio \( P:Q:R \).

*Example:*

If \( P:Q = 2:3 \) and \( Q:R = 4:7 \), find the ratio \( P:Q:R \).

In the above two ratios, we find “\( Q \)” in common.

The value corresponding to \( Q \) in the first ratio is 3 and in the second ratio is 4.

\( L.C.M \) of (3, 4) = 12.

So, if multiply the first ratio by 4 and second by 3, we get \( P:Q = 8:12 \) and \( Q:R = 12:21 \).

Now we have same value (12) for “\( Q \)” in both the ratios.

Now the values corresponding to \( P, Q \) & \( R \) are 8, 12 & 21.

Hence the ratio \( P:Q:R = 8:12:21 \)
Hint 9:
If the ratio of speeds of two vehicles in the ratio \(a:b\), then time taken ratio of the two vehicles would be \(b:a\).

Example:
The ratio of speeds of two vehicles is 2:3. Then time taken ratio of the two vehicles to cover the same distance would be 3:2.

Hint 10:
If the ratio of speeds of two vehicles in the ratio \(a:b\), then the distance covered ratio in the same amount of time would also be \(a:b\).

Example:
The ratio of speeds of two vehicles is 2:3. Each vehicle is given one hour time. Then, the distance covered by the two vehicles would be in the ratio 2:3.

Hint 11:
If A is twice as good as B, then the work completed ratio of A and B in the same amount of time would be 2:1.

Example:
A is twice as good as B and each given 1 hour time. If A completes 2 unit of work in 1 hour, then B will complete 1 unit of work in one hour.

Hint 12:
If A is twice as good as B, then the time taken ratio of A and B to do the same work would be 1:2.

Hint 13:
If “m” kg of one kind costing \(a\) per kg is mixed with “n” kg of another kind costing \(b\) per kg, then the price of the mixture would be \$
\frac{ma+nb}{m+n}\$ per kg.

Example:
A is twice as good as B and each given the same amount of work to complete. If A takes 1 hour to complete the work, then B will take 2 hours to complete the same work.

Ratio:
Ratio can be simply said as fractions. A number which is written as a fraction. Then, the Ratio’s specified is not the exact value and it is the multiples of the value specified.

Ratio compares 2 numbers and they should be of the same unit.
The reciprocal of the same number is not same ie (4/3) is not equal to (3/4)

Example:

1. The reciprocal of the same number is not same ie (4/3) is not equal to (3/4)

2. The value is Multiples of 4

3. The value is Multiples of 3

# 1. TYPE 1:

BASIC PROBLEMS:

This is Basic type of questions in Ratio and Proportion, In this type Question contains Individual Ratio/Total Ratio and Individual Value/Total Value then, you will be asked to find the Ratio or Value. Since these type of questions are basic questions, and they can used in any other topic.

1. If a certain sum of money is distributed among A and B in the ratio 4:3 and B gets Rs. 3000, then what is total money distributed?

Explanation:

\[
\begin{array}{c|c|c}
A & B & A+B \\
4x & 3x & 7x \\
\end{array}
\]

\[3x=3000 \Rightarrow x=1000\]

Total money distributed = \[7x=7\times1000=Rs.7000\]

2. If a certain task is distributed among A, B, C and D in the ratio 2:5:7:9 in 1 day then D performs 1800 task in 1 day. Then how many task is completed for 2 day when A and B works?

Explanation:

\[A \text{ and } B \text{ when combines in 1 day they does } = 2x+5x=7x \]

\[7\times200=1400\]

For 2 days they complete \[1400\times2=2800\text{ task.}\]

# 2. TYPE 2:

BASED ON EFFICIENCY:

In this type efficiency of the Person is given and the ratio were also given we have to find the new ratio. Tricks and Tips to solve the Problem based on Efficiency.

1. Seats for mathematics, physics and biology in a school are in the ratio 5:7:8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?

Explanation:

The ratio’s are 5x:7x:8x let \[x=10\] then,

Mathematics = 50 Physics = 70 Biology = 80

Then Increased Percentage be 40%, 50% and 75%:

\[10\% \text{ of } 50=5 \text{ then } 140\% \text{ of } 50=70\]

\[10\% \text{ of } 70=7 \text{ then } 150\% \text{ of } 70=105\]

\[10\% \text{ of } 80=8 \text{ then } 175\% \text{ of } 80=140\]

Mathematics = 70 Physics = 105 Biology = 140

Their increased ratio = 2:3:4
# 3. TYPE 3:

**FORMATION OF NEW RATIO’S:**

This type of Problem consists of two Ratio’s and we asked to find a new ratio. These type of questions can be asked in Partnership Problems.

1. If \(a:b=2:3\) and \(b:c=2:4\) then \(a:b:c=?\)

Explanation:

\[
\begin{align*}
A & : B : C \\
2 & : 3 & : 4 \\
1 & : 2 & \quad \text{(After adjusting)}
\end{align*}
\]

Therefore the new Ratio = 2:3:6

2. If \(a:b=2:3\) and \(b:c=2:4\) and \(c:d=4:2\) then \(a:b:c:d=?\)

Explanation:

\[
\begin{align*}
A & : B & = 2 : 3 \\
B & : C & = 2 : 4 \\
C & : D & = \quad 4 : 2
\end{align*}
\]

\[
A : B : C : D = 2 \times 2 \times 4 : 3 \times 2 \times 4 : 3 \times 4 \times 4 : 3 \times 4 \times 2 = 16 : 24 : 48 : 24
\]

Therefore, the new Ratio is 2:3:6:3

---

**PROPORTIONS:**

The Equality Of Two Ratios Is Called Proportions.

Proportion has basically 5 types, Questions asked in IBPS Exams are nowadays with high difficulty, So, to solve all the difficult problems we should know how to solve the basic problems. Here we have covered all the basic Problem and its types and Shortcut method for solving all the basic Problems.

That is:

\[
\begin{align*}
A:B:C:D= & \text{Proportions} \\
\text{Here} & \ A,D=\text{extremes}\ C,B=\text{means} \\
\text{Ratio's}
\end{align*}
\]

**Rule:**

\[
A \times D = B \times C
\]

If \(X=KY, K=\text{constant}\) then \(X\) is directly proportional to \(Y\)

\(XY=K\), then \(X\) is inversely proportional to \(Y\).

---

#1. TYPE 1:

**FINDING NUMBER OF PERSON:**

These type of question in Proportionality are the basic type and we can solve these type of problems by two methods.
### TYPE 1:
**1. Method 1: Solving by equations**

2. Method 2: Shortcut Method

---

**1. A sum of Rs. 312 is to be distributed among 100 boys and girls such that if each boy gets Rs. 3.60 and each girl gets Rs. 2.40 then find how many number of boys in the class?**

**Explanation:**

Let there be X boys in the class and Y girls in the class.

\[ X + Y = 100 \]

\[ 3.6X + 2.4Y = 312 \]

By solving 1 & 2 we get \( X = 60 \) and \( Y = 40 \)

The number of boys present in the class = 60

**Shortcut Method:**

<table>
<thead>
<tr>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.60</td>
<td>2.40</td>
</tr>
</tbody>
</table>

\[ \frac{3}{5} \]

\[ 100 \times \frac{3}{5} = 60 \]

The number of Boys = 60

---

**2. In a 80 litre of solution containing milk and water in the ratio 2:3, how much milk should be added to the solution so that the new ratio becomes 4:1?**

**Explanation:**

The new ratio is 4:1 that means only water is added to the solution which means that the water in the solution remains constant in the new ratio also.

**Therefore \( 1x = 48 \) litre**

\[ 4x = 192 \] litre where as the solution already contain 32 litre therefore we should add 160 litres of milk

**2. In a 60 litres mixture of milk and water the ratio of milk and water is 7:5. How much water should be added in the mixture so that the ratio of milk to water becomes 5:7?**

**Explanation:**

Mixture 60

<table>
<thead>
<tr>
<th>Milk</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>7x</td>
<td>5x</td>
</tr>
</tbody>
</table>

Milk is not added and kept as it is so
\[ 5x = 35 \]

\[ x = 7 \]

By \( 7x = 7 \times 7 = 49 \)

Already there is 25 litres of water in the mixture so additionally we need to add 24 litres of water

---

**#2 TYPE 2:**

**Based on addition/subtraction of quantity:**

---
#.3 TYPE 3:

**BASED ON EQUALITY:**

If the original ratio \(a:b\)

**Duplicate Ratio:** \(a^2:b^2\)

**Sub Duplicate Ratio:** \(\sqrt{a}:\sqrt{b}\)

**Triplicate Ratio:** \(a^3:b^3\)

**Sub Triplicate Ratio:** \(a^{1/3}:b^{1/3}\)

1. If Twice A Is Equal To 3b And That Is Equal To 5 Times Of C. Then Find A:b:c?

   **Explanation:**
   
   LCM of 2,3,5 = 30
   
   \(a:b:c = \frac{30}{2}:\frac{30}{3}:\frac{30}{5}\)
   
   \(= 15:10:6\)

2. If The Sub Duplicate Ratio Of A:b = 2:3. Then Find The Triplicate Ratio Of A:b?

   **Explanation:**
   
   \(\sqrt{a}:\sqrt{b} = \frac{2}{3}\)
   
   \(a:b = \frac{4}{9}\)
   
   \(a^3:b^3 = \frac{64}{729}\)

3. A Hound Pursues A Hare And Takes 6 Leaps For Every 9 Leaps Of The Hare, But 3 Leaps Of The Hound Are Equal To 5 Leaps Of The Hare. Compare The Rates Of The Hound And The Hare?

   **Explanation:**
   
   Given:
   
   Hound: Hare
   
   6L : 9L
   
   3Hound = 5Hare
   
   Hound = \(\frac{5}{3}\)Hare
   
   Rates of Hound: Rates of Hare
   
   6*(\(\frac{5}{3}\)L : 9L
   
   10:9

**Some important points:**

1) If ratio is written as \(A:B\), it is said to be a linear form and in case it is written as \(A/B\), it is said to be fractional form.

2) Ratio does not have any unit. It is mere number.

3) The equality of two ratios is known as proportion i.e. \(a/b = c/d\)

   If \(a/b = c/d\), then it is also equal to \(a+c/b+d\)

   **Invertendo:** If \(a/b = c/d\), then \(b/a = d/c\)

   **Alterendo:** If \(a/b = c/d\), then \(a/c = b/d\)

   **Componendo:** If \(a/b = c/d\), then \(a+b/b = c+d/d\)

   **Dividendo:** If \(a/b = c/d\), then \(a-b/b = c-d/d\)

   **Componendo and Dividendo:** If \(a/b = c/d\), then \(a+b/a-b = c+d/c-d\)

4) If \(a/b = b/c = c/d = \ldots \) so on, then \(a,b,c,d\ldots\) are in G.P.
Proof: Let \( \frac{a}{b} = \frac{b}{c} = \frac{c}{d} = k \)
\( c = dk, b = ck, a = bk \)
Therefore, \( b = dk^2 \) and \( a = dk^2 \)
All are in G.P.

5) If \( a > b \) and same positive number is added to each term, then ratio decreases.
For example: \( \frac{a}{b} = \frac{4}{3} = 1.3 \), If 2 is added to each term, then \( \frac{a}{b} = \frac{4+2}{3+2} = \frac{6}{5} = 1.2 \)
Therefore, ratio decreases.

6) If \( a < b \) and same positive number is added to each term, then ratio increases.
For example: \( \frac{a}{b} = \frac{3}{4} = 0.7 \), If 2 is added to each term, then \( \frac{a}{b} = \frac{3+2}{4+2} = \frac{5}{6} = 0.8 \)
Therefore, ratio increases.

7) If we multiply or divide any number, there will be no effect on ratio.

8) Let \( a:b \) is a ratio

\( a^2:b^2 \) is duplicate ratio of \( a:b \)
\( a^3:b^3 \) is triplicate ratio of \( a:b \)
\( a^{1/2}:b^{1/2} \) is sub-duplicate ratio of \( a:b \)
\( a^{1/3}:b^{1/3} \) is sub-triplicate ratio of \( a:b \)

9) Proportions i.e. \( a:b = c:d \)
\( a \) and \( d \) are known to be extremes
\( b \) and \( c \) are known to be means.

10) In \( a:b :: c:d \), \( d \) is fourth proportional to \( a,b \) and \( c \).

11) If \( x \) is third proportional to \( a,b \) then it is written as \( a:b :: b:x \).

**Ratio And Proportion Concept**

**Ratio** – It is a way of comparing two numbers or quantities and showing the relationship between them.

It is denoted by \( \rightarrow :\)
$x=20$

so, boys $=3x = 3\times 20 = 60$ and girls $=2x = 2\times 20 = 40$

Another way:

In 5 (i.e 3+2=5) students there are 3 boys

so, 1 student, there are $\frac{3}{5}$ boys

∴ In 100 student boys are $(\frac{3}{5})\times 100 = 60$ boys

In 5 (i.e 3+2=5) students there are 2 girls

so, 1 student, there are $\frac{2}{5}$ girls

∴ In 100 student girls are $(\frac{2}{5})\times 100 = 40$ girls

OR

girls $= 100 - 60 = 40$ girls

Shortcut:

boys $= (\frac{3}{5})\times 100 = 60$ boys

Girls $= (\frac{2}{5})\times 100 = 40$ girls

Important Point:

⇒ For a ratio, the two quantities must be in the same unit.

Ex: Ratio of Rs 5 to Rs 30 here unit = Rs. In this example both quantities unit are same.

So, Ratio $= \frac{5}{30} = 1:6$

Ex-2 Ratio of Rs 5 to 30 paise.

Solution: we can’t express in the form of a ratio, because a unit of both quantities is not same.

if u want to express in the form of a ratio, first of all, make the unit of both quantities are same.

The multiplication or division of each term of a ratio by the same non-zero number does not effect the ratio.

Ex: 4:5

$\frac{\frac{4}{5} \times 2}{\times 2} = \frac{8}{10}$ i.e $8:10 = 4:5$

PROPORTION:

If the ratio of the first and second quantities is equal to the ratio of the third and fourth quantities then it is called proportion.

It is represented by → ‘∷’

i.e if $a:b=c:d$, we write $a:b∷c:d$ and we say that $a, b, c, d$ are in proportional

Here $a$ and $d$ are called extremes while $b$ and $c$ are called mean terms.

Ex: check 6, 10, 48, 80 are in proportional

Solution: $6/10=3/5=3:5$

and $48/80=3/5=3:5$

so, 6, 10, 48, 80 are in proportional.

⇒ Fourth Proportional: If $a:b=c:d$, then $d$ is called the fourth proportional to $a, b, c$.

⇒ Fourth Proportional $(d) = (b\times c)/a$

⇒ Third Proportional: If $a:b=b:c$, then $c$ is called the third proportional to $a$ and $b$. 
⇒ Third Proportional (c) = $b^2/a$
⇒ Mean Proportional between a and b = $\sqrt{ab}$.
⇒ Duplicate ratio of a:b = $a^2:b^2$.
⇒ Sub-duplicate ratio of a:b = $\sqrt{a}:\sqrt{b}$.
⇒ Triplicate ratio of a:b = $a^3:b^3$.

A common type of Ratio And Proportion problem that is frequently asked in the various competitive exams.

(Q1) If A:B = 2:3 B:C = 4:3 Find A:B:C

Solution:

[Concept: A:B and B:C दोनों में B common है so दोनों में जो B का ratio दिया हुआ है उसे equal करेंगे]

A:B  B:C
1× 2:1  2×1:3
  2:1     2:6


2nd Method:

∴ A:B:C=8:12:9 Ans.

(Q2) A:B=2:1 and A:C=1:3 then A:B:C is

Solution:

[Concept: A:B and A:C दोनों में A common है so दोनों में जो A का ratio दिया हुआ है उसे equal करेंगे]

A:B  B:C
  5:2     2:3

Ratio of B is same
So, A:B:C=5:2:3

Now,

A:B:C  C:D
  5:2:3×5  3×5:3
  25:10:15 15:9


(Q3) If A:B=5:2 B:C=2:3 C:D=5:3 find ratio of A:B:C:D=

Solution:

[Concept: A:B:C and C:D दोनों में C common है so दोनों में जो C का ratio दिया हुआ है उसे equal करने के लिए 3 se multiply किया गया है]

A:B  B:C  C:D
  5:2     2:3   5:3


(Q4) If A:B=4:9 and A:C=2:3 then (A+B):(A+C) is.

Solution:[Concept: A:B and A:C दोनों में A common है so दोनों में जो A का ratio दिया हुआ है उसे equal करेंगे]
$$A:B:C = 4:9:6$$

Now,

$$(A+B):(A+C) = (4+9):(4+6) = 13:10 \text{ Ans.}$$

(Q5) If $2A = 3B = 4C$, then $A:B:C$ is.

Solution:

L.C.M of 2, 3, 4 = 12

Now,

$$\frac{2A}{12} = \frac{3B}{12} = \frac{4C}{12}$$

$$\frac{A}{6} = \frac{B}{4} = \frac{C}{3}$$

$A:B:C = 6:4:3 \text{ Ans.}$

(Q6) If $A = (\frac{1}{4})B$ and $B = (\frac{1}{2})C$ then $A:B:C$ is

Solution:

$$A:B = 1:4 \text{ and } B:C = 1:2$$

[Concept: $A:B$ and $B:C$ दोनों में $B$ common है, $B$ का ratio दिया हुआ है उसे equal करेंगे]

$A:B:C = 2:3:7$

So, $(A+B):(B+C):(C+A) = 5:10:9 \text{ Ans.}$

(Q7) If $A:B = 2:3$ and $B:C = 3:7$ then $A:B:(B+C):(C+A)$ is.

Solution:

$$[Concept: A:B = 2:3 \text{ B:C = 3:7 दोनों में } B\text{ common है, } B\text{ का ratio दिया हुआ है उसे equal करेंगे} \text{ but in this question ratio of } B\text{ in both cases are equal.}]$$

$A:B:C = 2:3:7$

$$(A+B):(B+C):(C+A) = 5:10:9 \text{ Ans.}$$

(Q8) If $x:y = 4:5$ then $(3x+4y):(5x+3y) =$?

Solution:

$$\frac{3x+y}{5x+3y} = \frac{\frac{3x}{y}+1}{\frac{5x}{y}+3}$$

Put the value of $x/y$ then

$$(3x+4y):(5x+3y) = 17:35 \text{ Ans.}$$

(Q9) If $a:b:c = 2:3:4$ and $2a-3b+4c = 33$, then the value of $c$ is.

Solution:

$$a:b:c = 2:3:4$$

$$\therefore a/2 = b/3 = c/4 = K(let)$$

$$\Rightarrow a = 2k, b = 3k, \text{ and } c = 4k$$

Given that $2a-3b+4c = 33$

$$\Rightarrow 2\times2k-3\times3k+4\times4k = 33$$
(Q1) The product of two positive integers is 1575 and their ratio is 9:7. The smaller integer is.

\[ \text{So, } k = 3 \]

\[ \therefore c = 4k = 4 \times 3 = 12 \text{ Ans.} \]

(Q10) The fourth proportional to 4, 9, 12 is.

Solution:

Let the fourth proportional to 4, 9, 12 be \( x \).

Then, \( 4:9::12:x \)

\[ \Rightarrow 4x = 9 \times 12 \]

\[ \Rightarrow x = 27 \text{ Ans.} \]

(Q11) The third proportional to 16 and 36 is.

Solution:

Let the third proportional to 16 and 36 be \( x \).

Then, \( 16:36:36:x \)

\[ \Rightarrow 16x = 36 \times 36 \]

\[ \Rightarrow x = 81 \text{ Ans.} \]

(Q12) The mean proportional between 0.08 and 0.18 is.

Solution:

The mean proportional between 0.08 and 0.18 is:

\[ \sqrt{0.08 \times 0.18} = \sqrt{\frac{8}{100} \times \frac{18}{100}} = \frac{12}{100} = 0.12 \text{ Ans.} \]

(Q1) The product of two positive integers is 1575 and their ratio is 9:7. The smaller integer is.

\[ \text{Solution:} \]

Let the integers be 9\(x\) and 7\(x\) respectively.

According to question

\[ 9x \times 7x = 1575 \]

\[ \Rightarrow x^2 = 1575/63 = 25 \]

\[ \Rightarrow x = 5 \]

\[ \therefore \text{ smaller integer } = 7x = 7 \times 5 = 35 \text{ Ans.} \]

(Q2) Three numbers are in the ratio of 3:2:5 and the sum of their squares are 1862. The smallest of these numbers is.

Solution:

Let the number be 3\(x\), 2\(x\) and 5\(x\) respectively.

According to question

\[ (3x)^2 + (2x)^2 + (5x)^2 = 1862 \]

\[ \Rightarrow 38x^2 = 1862 \]

\[ \Rightarrow x^2 = 1862/38 = 49 \]

\[ \Rightarrow x = 7 \]

\[ \therefore \text{ The smallest number } = 2x = 2 \times 7 = 14 \text{ Ans.} \]
(Q3) The sum of three numbers is 116. The ratio of second to the third is 9:16 and the first to the third are 1:4. The second number is.

Let the 1st, 2nd, and 3rd number be $8x$, $9x$, and $12x$ respectively.

Let $x$ be added then

$$\frac{6+x}{14+x} = \frac{18+x}{38+x}$$

$\Rightarrow 228 + 38x + 6x + x^2 = 252 + 14x + 18x + x^2$

$\Rightarrow x^2 + 44x + 228 = x^2 + 32x + 252$

$\Rightarrow 12x = 24$

$\therefore x = 2$ Ans.

Second Method:

Let $x$ be added then

$$\frac{6+x}{14+x} = \frac{18+x}{38+x}$$

Put the value from option then

Therefore, the second number = $(9/29) \times 116$

= 36 Ans.

(Q4) 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:

 conceive: if $a, b, c, d$ are in proportion then $a:b::c:d$ or $a:b = c:d$ or $a/b = c/d$

Let $x$ is added then

$$\frac{8+3x}{9+3x} = \frac{18+3x}{38+3x}$$

$\Rightarrow 228 + 36x + 6x + x^2 = 252 + 14x + 18x + x^2$

$\Rightarrow x^2 + 44x + 228 = x^2 + 32x + 252$

$\Rightarrow 12x = 24$

$\therefore x = 2$ Ans.

(Q5) What number should be added to each of 6, 14, 18 and 38 so that the resulting numbers make a proportion?

Concept: if $a, b, c, d$ are in proportion then $a:b::c:d$ or $a:b = c:d$ or $a/b = c/d$

Let $x$ be added then

$$\frac{6+x}{14+x} = \frac{18+x}{38+x}$$

Put the value from option then

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

Solution:
\[
\frac{6+2}{14+2} = \frac{18+2}{38+2}
\]
\[
\Rightarrow \frac{8}{16} = \frac{20}{40}
\]
\[
\Rightarrow 1/2 = 1/2
\]

\[(Q6)\text{Three numbers are in the ratio } 3:4:5. \text{ The sum of the largest and the smallest equals the sum of the second and } 52. \text{ The smallest number is.}\]

Solution:
Let the numbers be \(3x, 4x\) and \(5x\)
Now according to question
\[5x+3x = 4x+52\]
\[\Rightarrow 4x=52\]
\[\Rightarrow x=13\]
\[\therefore \text{Smallest number}=3x=3\times13=39 \text{ Ans.}\]

\[(Q7)\text{If the square of the sum of two numbers is equal to } 4 \text{ times of their product, then the ratio of these numbers is:}\]

Solution:
Let the numbers are \(x\) and \(y\)
Now according to question
\[(x+y)^2 = 4xy\]
\[\Rightarrow x^2 + y^2+2xy = 4xy\]
\[\Rightarrow x^2 + y^2-2xy=0\]
\[\Rightarrow (x-y)^2 = 0\]
so, \(x=y\)
\[\therefore x:y=1:1 \text{ Ans.}\]

\[(Q8)\text{The sum of two numbers is equal to } 20 \text{ and their difference is } 25. \text{ The ratio of the two numbers is.}\]

Solution:
1st method: Shortcut
\[20+25 : 20-25\]
\[=45 : 5\]
\[=9 : 1 \text{ Ans.}\]

2nd Method: General
Let the numbers are \(x\) and \(y\)
Now according to question
\[x+y = 25 \quad \text{(1)}\]
\[x-y = 20 \quad \text{(2)}\]
on adding Eqn.(1)and (2)
\[\Rightarrow 2x= 45\]
\[\Rightarrow x=22.5\]
put the value of x in Eqn.(1)

⇒ 22.5 + y = 25

y = 2.5

∴ Required ratio = 22.5:2.5 = 9:1 Ans.

(Q9) If A and B are in the ratio 4:5 and the difference of their squares is 81, what is the value of A?

यदि A तथा B 4:5 के अनुपात में हैं और उनके वर्गों का अंतर 81 है, तो A का मान ज्ञात करें

Solution:

Let A = 4x and B = 5x

Now according to question

(5x)² - (4x)² = 81

⇒ 9x² = 81

⇒ x² = 81/9 = 9

⇒ x = 3

∴ A = 4x = 4 × 3 = 12 Ans.

(Q1) The ratio of two numbers is 3:4 and their LCM is 120. The sum of numbers is.

दो संख्याएँ 3:4 के अनुपात में हैं और उनका लघुतम समापवर्त्य 120 है तो संख्याओं का योग ज्ञात करें

Solution:

Let the numbers be 3x and 4x respectively.

LCM of 3x and 4x = 12x

⇒ 12x = 120

⇒ x = 10

∴ Sum of the numbers = 3x + 4x = 7x = 7 × 10 = 70 Ans.

(Q2) The ratio of two numbers is 3:4 and their HCF is 15. Then the sum of the two numbers is:

दो संख्याएँ 3:4 के अनुपात में हैं और उनका महत्तम समापवर्त्य 15 है तो संख्याओं का योग ज्ञात करें

Solution:

Let the numbers be 3x and 4x respectively.

HCF of 3x and 4x = x

⇒ x = 15

∴ Sum of the two numbers = 3x + 4x = 7x = 7 × 15 = 105 Ans.

(Q1) 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.

286 छात्रों की एक स्कूल में लड़कों व लड़कियों का अनुपात 8:5 है यदि 22 और लड़कियों स्कूल में दाखिला लेती है तो लड़कों व लड़कियों का नया अनुपात ज्ञात करें

Solution:

Let boys = 8x and girls = 5x

Now, According to the question

8x + 5x = 286

⇒ x = 286/13 = 22

Boys = 8 × 22 = 176
**Girls** = 5 * 22 = 110

No. of girls at present after adding 22 girls = 110 + 22 = 132

∴ Ratio = 176/132 = 4:3 Ans.

**Method - 2**

Initially number of boys = \((8/8+5) \times 286 = (8/13) \times 286 = 176\)

Number of girls = \((5/13) \times 286 = 110\)

No. of girls at present after adding 22 girls = 110 + 22 = 132

∴ Ratio = 176/132 = 4:3 Ans.

(Q2) 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.

(र)यदि कारखाने में मजदूरों की संख्या में 15:11 के अनुपात में कटौती हो और उनकी मजदूरी 22:25 के अनुपात में बढ़ाई जाए तो उनकी कुल घंटी बिल्ड मजदूरी का अनुपात जानें?

Solution: 1st Method: Shortcut

<table>
<thead>
<tr>
<th>1st Number</th>
<th>2nd Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>5</td>
</tr>
<tr>
<td>Original</td>
<td>3</td>
</tr>
</tbody>
</table>

Difference = 2

Now,

2 unit = 10

1 unit = 5

1st number = 3 * 5 = 15

2nd number = 5 * 5 = 25

Second Method: Shortcut

<table>
<thead>
<tr>
<th>1st Number</th>
<th>2nd Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>5</td>
</tr>
<tr>
<td>Original</td>
<td>3</td>
</tr>
</tbody>
</table>

Now, cross multiply

\((25-21)/7-5 = 4/2=2\)

Concept: [2 unit को 10 unit बनाना होगा क्योंकि question में दिया है 10 unit add किया जा रहा है]
So, $2 \times 5 = 10$

1st number $= 3 \times 5 = 15$

2nd number $= 5 \times 5 = 25$

**Third Method: General Method**

Let the number be $3x$ and $5x$

Now, According to the question

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

$\Rightarrow 2x + 70 = 25x + 50$

$\Rightarrow 4x = 20$

$\therefore x = 5$

1st number $= 3 \times 5 = 15$

2nd number $= 5 \times 5 = 25$

**Important Note:** When the difference is the same, the question can be solved using method-1, 2 and 3.

(Q4) What should be added to each term of the ratio 7:11, so as to make it equal to 3:4?

<table>
<thead>
<tr>
<th>1st Number</th>
<th>2nd Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>7</td>
</tr>
<tr>
<td>New</td>
<td>3</td>
</tr>
</tbody>
</table>

Now, cross multiply

$(33-28)/4 - 3 = 5/1 = 5$ Ans.

**2nd Method: General Method**

Let the required number be $x$.

Now,

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

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

$\Rightarrow x = 5$ Ans.

(Q5) Two numbers are in the ratio 4:5 respectively. If each number is subtracted by 25, then the ratio becomes 3:4. Find the two numbers.

<table>
<thead>
<tr>
<th>1st Number</th>
<th>2nd Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>4</td>
</tr>
<tr>
<td>New</td>
<td>3</td>
</tr>
</tbody>
</table>

Solution: 1st Method: Shortcut

Now

$1 \text{ unit} = 25$
1st number = 4 × 25 = 100

2nd number = 5 × 25 = 125

Second Method: Shortcut

<table>
<thead>
<tr>
<th>1st Number</th>
<th>2nd Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>4</td>
</tr>
<tr>
<td>New</td>
<td>3</td>
</tr>
</tbody>
</table>

Now, cross multiply

\[(16 - 15)/4 - 3 = 1/1 = 1\]

Concept: [1 unit को 25 unit बनाना होगा क्योंकि question में दिया है 25 unit subtract किया जा रहा है]

So, 1 × 25 = 25

1st number = 4 × 25 = 100

2nd number = 5 × 25 = 125

Third Method: General Method

Let the number be 4x and 5x

Now, According to the question

\[(4x - 25)/(5x - 25) = 3/4\]

\[⇒ 16x - 100 = 15x - 75\]

\[⇒ x = 25\]

1st number = 4 × 25 = 100

2nd number = 5 × 25 = 125

Important Note: जब difference same आएगा तब हमलोग इस type के question को method-1, 2 और 3 से solve करेंगे।

(Q6) What number should be subtracted from both the terms of the ratio 11:15 so as to make it as 2:3?

11:15 अनुपात की संख्याओं में किस संख्या को घटाया जाए की अनुपात 2:3 हो जाए?

Solution: 1st Method: Shortcut

<table>
<thead>
<tr>
<th>1st Number</th>
<th>2nd Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>11</td>
</tr>
<tr>
<td>New</td>
<td>2</td>
</tr>
</tbody>
</table>

Now, cross multiply

\[(33 - 30)/3 - 2 = 3/1 = 3 \text{ Ans.}\]

2nd Method: General Method

Let the required number be x.

Now,

\[(11-x)/(15-x) = 2/3\]

\[⇒ 33 - 3x = 30 - 2x\]

\[⇒ x = 3 \text{ Ans.}\]

(Q7) 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.
Solution: 1st Method: Shortcut

<table>
<thead>
<tr>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Original</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Diff.</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Now,

3 unit = 12
1 unit = 4

Initially the number of students = 19
unit = 19 × 4 = 76 Ans.

2nd Method: General Method

Let the original number of students be 4x, 6x, and 9x.

Now,

\[
\frac{4x + 12}{6x + 12} = \frac{7}{9}
\]

\[
⇒ 42x + 108 = 54x + 72
\]

\[
⇒ 12x = 36
\]

\[
⇒ x = 3
\]

Initially the number of students = 19x = 19 × 4 = 76 Ans.

Important Note: जब difference same आएगा तब हमलोग इस type के question को method-1 and 2 solve कर सकते हैं पर यदि इस type के question में difference same नहीं आएगा तब हमलोग method-2 से solve करेंगे.

(Q8) The ratio between the boys and girls in a class is 6:5 respectively. If 8 more boys join the class and two girls leave the class then the respective ratio becomes 11:7. What is the number of boys in the class now?

Solution:

Let the number of boys and girls be 6x and 5x respectively.

According to the question,

\[
\frac{6x + 8}{5x - 2} = \frac{11}{7}
\]

\[
⇒ 42x + 56 = 55x - 22
\]

\[
⇒ 13x = 78
\]

\[
⇒ x = 6
\]

\[
∴ Number of boys in the class = 6x + 8
\]

= 6 × 6 + 8 = 42 Ans.

(Q1) 80 liters of a mixture contains milk and water in the ratio of 27:5. How much is more water to be added to get a mixture containing milk and water in the ratio of 3:1?
80 लीटर के एक मिश्रण में दूध व पानी का अनुपात 27:5 है | तो कितना पानी और मिलाया जाए के मिश्रण में दूध व पानी का अनुपात 3:1 हो जाए?

**Solution:** Method-1-Shortcut

<table>
<thead>
<tr>
<th>M : W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial-&gt; 27 : 5</td>
</tr>
<tr>
<td>Final-&gt; 3 : 1</td>
</tr>
</tbody>
</table>

[Concept: According to question mixture में अलग से दूध के मिश्रण को बात की जा रही है तो so in both situation (i.e initial state and Final state) quantity of milk will be equal. but यहाँ पर milk की मात्रा (quantity) दोनों में equal नहीं है so milk की मात्रा (quantity) equal करनी होगी]

32 units (i.e 27 + 5) = 80 litres

1 unit = 80/32

∴ 4 unit = (80/32) × 4 = 10 litres Ans.

Method-2

<table>
<thead>
<tr>
<th>M:W</th>
<th>27 : 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 litre</td>
<td>i.e total quantity of mixture</td>
</tr>
</tbody>
</table>

$\text{Milk} = 80 \times (27/32) = 67.5 \text{ litres}$

$\text{Water} = 80 - 67.5 = 12.5 \text{ litres}$

OR

Let $x$ litre water to be added then

$67.5(12.5 + x) = 3/1$

$\Rightarrow 37.5 + 3x = 67.5$

$\Rightarrow x = 10 \text{ litre Ans.}$

Method-3

Let quantity of milk in the mixture = 27$^x$

and quantity of water = 5$^x$

Now,

$32x = 80$ liters

∴ $x = 5/2$

$\text{Milk} = 27\times(5/2) = 67.5 \text{ litres}$

$\text{Water} = 5\times(5/2) = 12.5 \text{ litres}$

Let $y$ litre water to be added then

$67.5(12.5 + y) = 3/1$

$\Rightarrow 37.5 + 3y = 67.5$

∴ $y = 10 \text{ litre Ans.}$

(Q2) 20 litres of a mixture contains milk and water in the ratio of 3:1. How much more milk is to be added to get a mixture containing milk and water in the ratio of 4:1?
20 litres of a mixture contains milk and water in the ratio 3:1. If 10 litres of milk is added to the mixture, then what will be the ratio of water to milk in the new mixture?

Solution: Method-1: Shortcut

<table>
<thead>
<tr>
<th>M : W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial→ 3 : 1</td>
</tr>
<tr>
<td>Final→ 4 : 1</td>
</tr>
</tbody>
</table>

[Concept: According to question mixture मेंअलग से only milk add करने की बात की जा रही हैसो in both situation(i.e initial state and Final state) quantity of water will be equal. but यहाँपर water की मात्रा(quantity) दोनों में पहले सेequal है so water की मात्रा(quantity) equal करनेकी जरूरत नहीं है]

So,

<table>
<thead>
<tr>
<th>M : W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial→ 3</td>
</tr>
<tr>
<td>Diff.: 1</td>
</tr>
</tbody>
</table>

4 unit(i.e 3+1)=20 liters

∴ 1 unit=20/4=5 litres Ans.

Method-2

\[
\begin{align*}
M:W & \quad 3 : 1 \\
20 \text{ litre} & \quad \text{i.e total quantity of mixture} \\
\text{Milk(M)} & =20 \times \frac{3}{4}=15 \text{ liters} \\
\text{Water(W)} & =20 \times \frac{1}{4}=5 \text{ liters} \\
\end{align*}
\]

OR

Let x litre milk to be added then

\[
\frac{15+x}{5}=\frac{4}{1}
\]

⇒ 15+x=20

∴ x=5 litre Ans.

(Q3) 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?

729 ml के एक मिश्रण में दूध और पानी का अनुपात 7:2 है| तो कितना पानी और मिलाया जाए कीमिश्रण में दूध और पानी का अनुपात 7:3 हो जाए?

Solution: Shortcut

<table>
<thead>
<tr>
<th>M : W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial→ 7</td>
</tr>
<tr>
<td>Final→ 7</td>
</tr>
</tbody>
</table>

[Concept: According to question mixture मेंअलग से only water add करने की बात की जा रही है| so in both situation(i.e initial state and final state) quantity of milk will be equal. but यहाँपर milk की मात्रा(quantity) दोनों में पहले सेequal है so milk की मात्रा(quantity) equal करनेकी जरूरत नहीं है]

So,
9 unit(i.e 7+2)=729
∴ 1 unit=729/9=81 ml Ans.

(Q4) 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.

एक मिश्रधातु में तांबा, जिंक तथा निकेल 5:3:2 के अनुपात में है। इस मिश्रधातु के 100 किलोग्राम में कितनी निकेल की मात्रा (किग्रा. में) डाली जाए की नया अनुपात 5:3:3 हो जाए?

Solution: Shortcut

<table>
<thead>
<tr>
<th>CO : ZI : NI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial→ 5 : 3 : 2</td>
</tr>
<tr>
<td>Final→ 5 : 3 : 3 [Diff.=1]</td>
</tr>
</tbody>
</table>

10 unit(i.e 5+3+2)=100 kg
∴ 1 unit=100/10=10 Kg Ans.

(Q1) A mixture contains milk and water in the ratio 5:2 on adding 22 litres of water, the ratio of milk and water becomes 7:5. The quantity of water in the original mixture is.

एक मिश्रण में दूध और पानी का अनुपात 5:2 है। यदि 22 लीटर पानी और मिलाया जाए तो नए मिश्रण में दूध और पानी का अनुपात 7:5 हो जाता है। तो मिश्रण में पानी कितनी मात्रा जाएगी?

Solution: Shortcut

Let the initial quantity of milk in mixture=5x and water=2x
Adding 22 liters of water then

5x/(2x+22)=7/5

5x×5=14x+154

25x=14x+154

∴ x=14

The quantity of water in the original mixture=2x=2×14=28 liters Ans.
(Q2) 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.

**Solution: Shortcut**

\[
\begin{align*}
\text{M : W} & \\
\text{Initial} & \Rightarrow 7 : 5 \\
\text{Final} & \Rightarrow 7 : 8 \\
\end{align*}
\]

[Concept: According to question mixture में अलग से 15 litres water add करने की बात की जा रही है so in both situation(i.e initial state and Final state) quantity of milk will be equal, but यहाँ पर milk की मात्रा(quantity) दोनों में पहले से equal है so milk की मात्रा(quantity) equal करने की जरूरत नहीं है।]

Now,

\[
\begin{align*}
\text{M : W} & \\
\text{Initial} & \Rightarrow 7 : 5 & \text{Diff.} = 3 \\
\text{Final} & \Rightarrow 7 : 8 \\
\end{align*}
\]

3 unit=15

1 unit=15/3

∴ 8 unit=(15/3)*8=40 litre Ans.

**Method-2**

Let the initial quantity of milk in mixture=7x and water=5x

\[
\begin{align*}
7x/(5x+15) &= 7/8 \\
56x &= 35x + 105 \\
x &= 5 \\
\text{In new mixture milk} &= 7x \text{ and water} = 8x \\
\text{The quantity of water in the new mixture} &= 8x = 8 \times 5 = 40 \text{ liters Ans.}
\end{align*}
\]

(Q3) The milk and water in a mixture is 1:3. If 5 litres of milk are added to it, the ratio of milk and water in the new mixture becomes 1:2. The total quantity of new mixture(in litres) is.

**Solution: Shortcut**

\[
\begin{align*}
\text{M : W} & \\
\text{Initial} & \Rightarrow 1 : 3 \\
\text{Final} & \Rightarrow 1 : 2 \\
\end{align*}
\]

[Concept: According to question mixture में अलग से 5 litres milk add करने की बात की जा रही है so in both situation(i.e initial state and Final state) quantity of water will be equal, but यहाँ पर water की मात्रा(quantity) दोनों में equal नहीं है so water की मात्रा(quantity) equal करनी होगी]

Now,

\[
\begin{align*}
\text{M : W} & \\
\text{Initial} & \Rightarrow 7 : 5 & \text{Diff.} = 3 \\
\text{Final} & \Rightarrow 7 : 8 \\
\end{align*}
\]

\[
\begin{align*}
3 \text{ unit} &= 15 \\
1 \text{ unit} &= 15/3 \\
\therefore 8 \text{ unit} &= (15/3) \times 8 = 40 \text{ litre Ans.}
\end{align*}
\]
1 unit = 5 litres

9 unit (i.e. 3 + 6) = 9 × 5 = 45 litres Ans.

**Method-2**

Let the initial quantity of milk in mixture = \(x\)
and water = 3\(x\)

Adding 5 liters of milk then

\[
\frac{x + 5}{3x} = \frac{1}{2}
\]

\[
⇒ 2x + 10 = 3x
\]

\[
⇒ x = 10
\]

∴ Quantity of new mixture = 4\(x\) + 5

\[
= 4 \times 10 + 5 = 45 \text{ litres Ans.}
\]

(Q4) 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.

25 लीटर के एक मिश्रण में एसिड व पानी का अनुपात 4:1 है| यदि मिश्रण में 3 लीटर पानी मिलाया जाए, तो नए मिश्रण में एसिड व पानी का अनुपात क्या होगा?

Solution:
Solution: Shortcut

\[ \begin{array}{ccc}
\text{M} & \text{W} & \text{Total Quantity} \\
\text{Vessel 1} & 3 : 2 & = 5 \\
\text{Vessel 2} & 4 : 1 & = 5 \\
\end{array} \]

(Q2) 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.

Solution:

\[ \begin{array}{ccc}
\text{M} & \text{W} & \text{Total Quantity} \\
\text{Container 1} & 3 & 1 = 4 \times 7 = 28 \\
\text{Container 2} & 5 & 2 = 7 \times 4 = 28 \\
\end{array} \]

Now,

\[ \begin{array}{ccc}
\text{M} & \text{W} & \text{Total quantity} \\
\text{Container 1} & 21 & 7 = 28 \\
\text{Container 2} & 20 & 8 = 28 \\
\end{array} \]

\[ \frac{41}{15} \text{ Ans.} \]

(Q3) There are three vessels containing milk and water in the ratio 2:3, 1:4 and 4:1. If all the solutions are mixed together, the ratio of milk to water in the new mixture is.

Solution:

\[ \begin{array}{ccc}
\text{M} & \text{W} & \text{Total quantity} \\
\text{Container 1} & 3 & 1 = 4 \times 1.5 = 6 \\
\text{Container 2} & 5 & 2 = 7 \times 1.5 = 10.5 \\
\text{Container 3} & 8 & 4 = 12 \\
\end{array} \]

Total quantity of milk: \(6 + 10.5 + 12 = 28.5\)

Total quantity of water: \(3 + 7 + 12 = 22\)

\[ \frac{28.5}{22} = 135 : 110 \]

\[ \frac{28.5}{22} = 135 : 110 \]

\[ \frac{28.5}{22} = 135 : 110 \]
Here total quantity of all utensils are equal, so ratio of milk and water =7:8 Ans

Concept: [Total quantity of all are equal then simply Add, (milk1+milk2+milk3) : (water1+water2+water3)]

2nd method:

Total quantity of milk=2/5+1/5+4/5=7/5
Total quantity of water=3/5+4/5+1/5=8/5

Ratio= (7/5)/(8/5) = 7:8 Ans.

(Q4) Three glasses of equal volume contains acid mixed with water. The ratios of acid and water are 6:1, 5:2 and 3:1 respectively. Contents of these glasses are poured in a large vessel. The ratio of acid and water in the large vessel is.

Solution:

<table>
<thead>
<tr>
<th>Acid</th>
<th>Water</th>
<th>Total quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st glass -&gt; 6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2nd glass -&gt; 5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3rd glass -&gt; 3</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

Now,

Acid = (6/7)+(5/7)+(3/4) = (24+20+21)/28 = 65/28
Water = (1/7)+(2/7)+(1/4) = (4+8+7)/28 = 19/28
∴ Ratio= (65/28)/(19/28) = 65:19 Ans.

2nd Method

Total acid= (6/7)+(5/7)+(3/4)
= (24+20+21)/28 = 65/28
Total water= (1/7)+(2/7)+(1/4)
= (4+8+7)/28 = 19/28
∴ Ratio= (65/28)/(19/28) = 65:19 Ans.

(Q1) Two container A and B contain a mixture of Acid and water in the ratio of 4:5 and 5:1. If both containers are mixed in the proportion of 5:2 respectively, Find the ratio of acid and water in the newly formed mixture is.

Solution:

<table>
<thead>
<tr>
<th>Acid</th>
<th>Water</th>
<th>Total quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st glass -&gt; 6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2nd glass -&gt; 5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3rd glass -&gt; 3</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>
In 5 unit of mixture

Quantity of acid=(4/9)×5=20/9
Quantity of water=(5/9)×5=25/9

In 2 unit of mixture

Quantity of acid=(5/6)×2=5/3
Quantity of water=(1/6)×2=1/3

∴ Required ratio=([20/9]+(5/3)) : ([25/9]+(1/3))
= 35/9:28/9 =5:4 Ans.

Second Method:

<table>
<thead>
<tr>
<th>Acid</th>
<th>Water</th>
<th>Total Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container A-&gt;</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Container B-&gt;</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

(Q2) 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 the ratio of tin and iron in the newly formed alloy is:

Solution:

<table>
<thead>
<tr>
<th>Tin</th>
<th>Iron</th>
<th>Total Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st alloy-&gt;</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2nd alloy-&gt;</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

[ Concept: 1st alloy और 2nd alloy का total quantity equal नहीं है so, Step-1: 1st alloy और 2nd alloy के total quantity को equal करना है]
(Q3) Three glasses contain acid mixed with water. The ratios of acid and water are 3:2, 2:1 and 2:3 respectively. If the mixture taken out in the ratio 10:9:5. What is the ratio of acid and water in the new mixture?

<table>
<thead>
<tr>
<th>Step-1</th>
<th>Step-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin : Iron</td>
<td>Total Quantity</td>
</tr>
<tr>
<td>1st alloy-&gt;</td>
<td>1 : 2 = 3 - ( \times 5 )</td>
</tr>
<tr>
<td>2nd alloy-&gt;</td>
<td>2 : 3 = 5 - ( \times 3 )</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>24</td>
<td>36</td>
</tr>
<tr>
<td>39</td>
<td>66</td>
</tr>
<tr>
<td>13</td>
<td>22 Ans</td>
</tr>
</tbody>
</table>

Solution:  
\[
\text{Acid} : \text{Water} = \frac{1}{2} : \frac{1}{5} = \frac{1 \times 5}{2 \times 5} = \frac{5}{10}
\]

\[
\text{Required ratio} = \left(\frac{5}{10}:\frac{3}{10}\right) = \left(\frac{5}{10}:\frac{3}{10}\right) = \left(\frac{11}{70}:\frac{13}{40}\right)
\]

(Q1) Two vessels contain milk and water in the ratio 3:5 and 6:1. 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 7:3.

\[
\text{Required ratio} = \left(\frac{11}{70}:\frac{13}{40}\right)
\]
(Q2) 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.

\[
\therefore \text{Required ratio} = \frac{11}{70} : \frac{13}{40}
\]

\[
= 44:91 \text{ Ans.}
\]

(Q1) A vessel contains 80 liters of milk. 8 liters of milk is taken out from it and replaced by water. Then again from mixture, 8 liters is again taken out and replaced by water. Find the amount of milk in the final mixture.

\[
\text{Final quantity} = \text{Initial quantity} \left(1 - \frac{x}{c}\right)^n
\]

Where, \(c\) = capacity of vessel
\(x\) = Quantity taken out at a time
\(n\) = Number of process

\[
\text{Now, Final quantity} = 80 \left(1 - \frac{8}{80}\right)^2
\]

\[
= 22:35 \text{ Ans.}
\]
(Q2) A vessel contains 60 liters of milk. 12 liters of milk is taken out from it and replaced by water. Then again from mixture, 12 liters is again taken out and replaced by water. The ratio of milk and water in the resultant mixture is.

Final quantity = Initial quantity \( (1 - \frac{x}{c})^n \)

Now,

Final quantity = 60 \((1 - \frac{12}{60})^2\)

= 60 \((\frac{4}{5})^2\)

= 38.4 liters

Quantity of water = 60 - 38.4 = 21.6 liters

\[ \therefore \text{Required ratio} = \frac{38.4}{21.6} = \frac{16}{9} \text{ Ans.} \]

(Q3) A vessel contains 20 liters of acid. 4 liters of acid is taken out of the vessel and replaced by the same quantity of water. Next 4 liters of the mixture are with drawn, and again the vessel is filled up with water. The ratio of acid left in the vessel with that of the original quantity is.

\[ \text{Solution:} \]

\(\frac{x}{c} = \frac{7}{5} \]

\(\therefore x = 1.4\)

\[ \frac{9}{20} \times 1.4 \times (1 - \frac{1}{5})^2 \]

\[ \frac{9}{20} \times \frac{4}{5} \times \frac{4}{5} \]

\[ = \frac{9}{25} \times \frac{16}{25} \]

\[ = \frac{144}{625} \]

\[ = 0.228 \]

\[ \therefore \text{Required ratio} = 0.228 : 1 \]

\[ \text{Ans.} \]
(Q2) A vessel contains liquid A and B in ratio 5:3. If 16 liters of the mixture are removed and the same quantity of liquid B is added, the ratio becomes 3:5. What quantity does the vessel hold?

\[
\begin{align*}
\text{Liquid A} & : \text{Liquid B} \\
\text{Initially} & : 7 : 5 \\
\text{Finally} & : 1 : 1
\end{align*}
\]

\[
\begin{align*}
\text{Concept:} \quad \text{मिश्रण में से कुछ मिश्रण को यदि निकाला जाए तो निकाले गए मिश्रण में भी ratio उतना ही होगा जितना original mixture में था एवं बचे हुए mixture में भी ratio उतना ही होगा जितना original mixture में था बचे हुए mixture का ratio तब change होगा जब उसमे कुछ extra मिलाया जायेगा।
\end{align*}
\]

इस question में बचे हुए mixture में liquid B अलग मिलाया जा रहा है तो liquid B का ratio change होगा but liquid A का ratio उतना ही रहेगा जितना original mixture में था लेकिन question में दिया है कि final ratio 1:1 हो जाता है so final ratio में liquid A के ratio को 7 बनाना होगा।

\[
\begin{align*}
\text{Liquid A} & : \text{Liquid B} \\
\text{Initially} & : 7 : 5 \\
\text{Finally} & : 1 : 1 - \times 7 \\
& : 7 : 5 \\
& 2 \text{ units}
\end{align*}
\]

\[2 \text{ units}=9\]

\[1 \text{ unit}=9/2\]

\[
\begin{align*}
\text{Initial mixture} &= 12 \times (9/2) + 9 \\
&= 63 \text{ liters}
\end{align*}
\]

\[
\begin{align*}
\text{liquid A} &= (7/12) \times 63 = 36\frac{3}{4} \text{ liters Ans.}
\end{align*}
\]
(Q3) A can contains a mixture of two liquids A and B in the ratio 7:5. When 9 liters of mixture are drained off and the can is filled with B, the ratio of A and B becomes 7:9. How many liters of liquid A was contained by the can initially?

Let the initial amount of liquid A be 7x and liquid B be 5x. After draining off 9 liters of the mixture, the amount of A becomes 7x - 9 liters and B becomes 5x + 9 liters. Since the ratio of A to B becomes 7:9, we have

\[
\frac{7x - 9}{5x + 9} = \frac{7}{9}
\]

Solving for x,

\[
9(7x - 9) = 7(5x + 9)
\]

\[
63x - 81 = 35x + 63
\]

\[
28x = 144
\]

\[
x = \frac{144}{28} = \frac{36}{7}
\]

The initial amount of liquid A is

\[
7x = 7 \times \frac{36}{7} = 36
\]

\[
\text{液 A} = \frac{7}{12} \times 36 = \frac{21}{12} \times 36 = 21 \text{ liters}
\]

(Q1) The ratio of the income to the expenditure of a family is 10:7. If the family’s expenses are Rs 10,500, then saving of the family is.

Given that,

\[
\frac{Income}{Expenditure} = \frac{10}{7}
\]

\[
Expenditure = 10500
\]

\[
\text{Saving} = \text{Income} - \text{Expenditure}
\]

\[
\Rightarrow 7x = 10500
\]

\[
x = 1500
\]

\[
\therefore \text{saving} = 3 \times 1500 = 4500 \text{ Ans.}
\]

(Q2) The ratio of income and expenditure of a person is 11:10. If he saves Rs 9000 per annum, his monthly income is.

\[
\frac{Income}{Expenditure} = \frac{11}{10}
\]

\[
\text{Saving} = 11x - 10x = 3x
\]

\[
\Rightarrow 3x = 9000
\]

\[
x = 3000
\]

\[
\therefore \text{Income} = 11 \times 3000 = 33000
\]

\[
\text{Income} = 33000 \text{ Rs}
\]

\[
\text{Expenditure} = 10 \times 3000 = 30000
\]

\[
\text{Saving} = 10x - 11x = -x
\]

\[
\Rightarrow -x = -9000
\]

\[
x = 9000
\]

\[
\therefore \text{Income} = 33000 \text{ Rs}
\]

\[
\text{Expenditure} = 30000 \text{ Rs}
\]

\[
\text{Saving} = 9000 \text{ Rs}
\]
Given that,

\[ x = 9000 \]

\[ \text{Annual income} = 11x = 11 \times 9000 = \text{Rs } 99000 \]

\[ \therefore \text{Monthly income} = \frac{99000}{12} = \text{Rs } 8250 \text{ Ans.} \]

(Q3) 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 1/4th of his income, then the saving of A, B and C are in the ratio of.

Let the income of A, B and C be 7x, 9x and 12x respectively.

The spending of A, B and C be 8y, 9y and 15y respectively.

So, the saving of A, B and C are 7x - 8y, 9x - 9y, 12x - 15y.

Hence, the saving ratio of A, B and C is

\[ 7x - 8y : 9x - 9y : 12x - 15y = 56 : 99 : 69 \text{ Ans.} \]

Now according to the question

\[ \frac{2x - 600}{3x - 600} = \frac{5}{9} \]

\[ 18x - 5400 = 15x - 3000 \]

\[ 3x = 2400 \]

\[ x = 800 \]

Income of 1st person = 2x = 2 \times 800 = \text{Rs } 1600 \text{ Ans.}

Income of 2nd person = 3x = 3 \times 800 = \text{Rs } 2400 \text{ Ans.}

Second Method:

Step-1: सबसे पहले Income और Expenditure को cross-multiply करना है फिर उसके bad difference निकालना है।
(Q2) The incomes of two persons are in the ratio 3:2 and their expenditure are in the ratio 5:3. If each saves Rs. 1000, then 1st person income is.

Solution:

Let the income of 1st and 2nd person are 3x and 2x

\[ I = E + S \]

\[ 3x - 1000 = 5 \times \frac{5}{3} \]

\[ 9x - 3000 = 10x - 5000 \]

\[ x = 2000 \]

Income of 1st person = 3x = 3 × 2000 = Rs 6000 Ans.

Second Method

Step-1: पहले Income और Expenditure को cross-multiply करना है फिर उसके बाद difference निकालना है।

\[ \frac{3}{2} \]

\[ \frac{5}{3} \]

\[ \frac{Rs 1000}{1000} \]

\[ \frac{5}{3} \]

3 unit = 2400

1 unit = 800

Income of 1st person = 2 unit = Rs 1600 Ans.

Income of 2nd person = 3 unit = Rs 2400 Ans.
(Q1) 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 Rs 1300 and Rs 900 respectively.

Solution:

Let the income of 1st and 2nd person are 5x and 3x

Note: Income(I)=Expenditure(E) + Saving(S)

\[ I - S = E \]

Now according to the question

\[
\begin{align*}
5x - 1300 &= \frac{9}{5} \\
3x - 900 &= \frac{5}{25} \\
\Rightarrow 25x - 6500 &= 27x - 8100 \\
\Rightarrow x &= 800
\end{align*}
\]

Income of 1st person=5x=5×800

=Rs 4000 Ans.

Income of 2nd person=3x=3×800

=Rs 2400 Ans.

Second Method

Step-1: सबसे पहले Income और Expenditure को cross-multiply करना है फिर उसके बाद difference निकालना है

\[
\begin{align*}
\text{Income} & \rightarrow 5 \quad \rightarrow 3 \\
\text{Exp.} & \rightarrow 9 \quad \quad \rightarrow 5 \\
\text{Difference}=2 \text{ unit}
\end{align*}
\]

Step-2: Expenditure और Saving को cross-multiply करना है फिर उसके बाद difference निकालना है

\[
\begin{align*}
\text{Exp.} & \rightarrow 9 \quad \quad \rightarrow 5 \\
\text{Saving} & \rightarrow 1300 \quad 900 \\
6500 & - 8100 \\
\text{Difference}=1600
\end{align*}
\]

2 unit = 1600

1 unit = 800

Income of 1st person=5unit=Rs 4000 Ans.

Income of 2nd person=3unit=Rs 2400 Ans.

(Q2) Two person have their monthly incomes in the ratio 8:5, while their monthly expenditures are in the ratio 5:3. If they have saved Rs 12000 and Rs 10,000 monthly respectively, then the difference in their monthly income is.

Solution:

Let the income of 1st and 2nd person are 5x and 3x

\[
\begin{align*}
\text{Income} & \rightarrow 8 \quad \rightarrow 5 \\
\text{Exp.} & \rightarrow 5 \quad \quad \rightarrow 3 \\
\text{Saving} & \rightarrow 12000 \quad 10000
\end{align*}
\]

=Rs 6000 Ans.
Note: Income(I)=Expenditure(E) + Saving(S)

\[ I = E + S \]

Now according to the question

\[ \frac{8x}{5x} = \frac{12000}{10000} = \frac{5}{3} \]

\[ 24x - 36000 = 25x - 50000 \]

\[ x = 14000 \]

Income of 1st person = 8x = 8 × 14000 = Rs 112000

Income of 2nd person = 5x = 5 × 14000 = Rs 70000

Difference = 112000 - 70000 = 42000 Ans.

OR

Difference in monthly income = 8x - 5x = 3x

\[ 3x = 3 × 14000 = 42000 \text{ Ans.} \]

Second Method

Step-1: सबसे पहले Income और Expenditure को cross-multiply करना है फिर उसके बाद difference निकालना है।

<table>
<thead>
<tr>
<th>1st Person</th>
<th>2nd Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income -&gt;</td>
<td>8</td>
</tr>
<tr>
<td>Exp. -&gt;</td>
<td>5</td>
</tr>
<tr>
<td>25</td>
<td>24</td>
</tr>
</tbody>
</table>

Difference = 1 unit

Step-2: Expenditure और Saving को cross-multiply करना है फिर उसके बाद difference निकालना है।

Exp. -> 5

Saving -> 12000 10000

36000 50000

Difference = 14000

Difference in monthly income = 8 - 5 = 3

Now,

1 unit = 14000

3 unit = 14000 × 3 = 42000 Ans.

(Q1) 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.

Solution:

[Concept: 50 पैसे को Rs 1 बनाना है तो 50 पैसे को 2 से multiply करना होगा या यह भी कह सकते हैं 50 पैसे के 2 सिक्के लेंगे इस प्रकार 50 पैसे के total 8 सिक्के होंगे i.e. 4 × 2 = 8] 25 पैसे को Rs 1 बनाना है तो 25 पैसे को 4 से multiply करना होगा या यह भी कह सकते हैं 25 पैसे के 4 सिक्के लेंगे इस प्रकार 25 पैसे के total 12 सिक्के होंगे i.e 3 × 4 = 12]
Total no of coins=28
28 coins =280
1 coins = 10
No. of 50 paise coins = 8×10 =80 Ans.

(Q2) 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.

50 रु. 25 रु. और 10 रु. के कुल 480 सिक्के हैं। उनका मूल्य 5:3:1 के अनुपात में हैं। तो प्रत्येक सिक्के की संख्या कितनी है?

Solution:

Concept: 50 रु. को 1 रु. बनाना है तो 25 रु. को 1/2 रु. बनाने के लिए 2 सेमिटन 2 होगा। इस प्रकार 50 रु. के 2 सिक्के होंगे तो इस प्रकार 25 रु. के total 10 सिक्के होंगे।

Total no of coins=32
32 coins =480
1 coins = 15
No. of 50 paise coins = 10×15 =150 Ans.
No. of 25 paise coins = 12×15 =180 Ans.
No. of 10 paise coins = 10×15 =150 Ans.
**Ratio & Proportion Questions**

Q1. Seats for Maths, Physics and Biology are in the ratio of 5 : 7 : 8 respectively. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the respective ratio of increased seats?

1. 2 : 3 : 4
2. 6 : 7 : 8
3. 6 : 8 : 9
4. Cannot be determined
5. None of these

Q2. DVDs at a rent of Rs. 578. If they used it for 8 hours, 12 hours and 14 hours respectively, what is Kiara’s share of rent to be paid?

1. Rs. 238
2. Rs. 204
3. Rs. 192
4. Rs. 215
5. None of these

Q3. persons in the ratio of 2 : 3 : 4 : 5. Out of the four, one person gets Rs. 200 more than the other and Rs. 100 less than another. What is the sum?

1. Rs. 2800
2. Rs. 1400
3. Rs. 4200
4. Cannot be determined
5. None of these

Q4. In a college the number of students studying Arts, Commerce and Science are in the ratio of 3 : 5 : 8 respectively. If the number of students studying Arts, Commerce and Science is increased by 20%, 40% and 25% respectively, what will be the new ratio of students in Arts, Commerce and Science respectively?

1. 18 : 35 : 50
2. 3 : 10 : 10
3. 4 : 8 : 5
4. 32 : 35 : 25
5. None of these

Q5. 20 boys and 25 girls form a group of social workers. During their membership drive, the same number of boys and girls joined the group (e.g. if 7 boys joined, 7 girls joined). How many members does the group have now, if the ratio of boys to girls is 7 : 8?

1. 75
2. 65
3. 70
4. 60
5. None of these

Q6. A sum of money is divided among A, B, C and D in the ratio of 3 : 4 : 9 : 10 respectively. If the share of C is Rs. 2,580 more than the share of B, then what is the total amount of money of A and D together?

1. Rs. 5,676
2. Rs. 6,192
3. Rs. 6,708
4. Rs. 7,224
5. None of these

Q7. Production of company A is 120% of the production of company B and 80% of the production of company C. What is the ratio between the productions of companies A, B and C respectively?

1. 6 : 5 : 9
2. 6 : 5 : 4
3. 12 : 10 : 15
4. 10 : 12 : 15
5. None of these

Q8. Number of students in Arts and Science faculties in an institute are in the ratio of 5 : 8 respectively. If 150 more students join Art faculty while 80 more students join Science faculty, the respective ratio becomes 3 : 4. Originally what was the total number of students in both faculties together?

1. 1200
2. 1400
Q9. 75% of a number is equal to $\frac{5}{8}$th of another number. What is the ratio between the first number and the second number respectively?
(1) 5 : 4
(2) 6 : 5
(3) 4 : 5
(4) 5 : 6
(5) None of these

Q10. In a test, a candidate secured 336 marks out of maximum marks ‘x’. If the maximum marks ‘x’ were converted into 400 marks, he would have secured 192 marks. What were the maximum marks of the test?
(1) 700
(2) 750
(3) 500
(4) 650
(5) 800

Q11. Which of the following represents $ah = 64$?
(1) $8 : a = 8 : b$
(2) $a : 16 = b : 4$
(3) $a : 8 = b : 8$
(4) $32 : a = b : 2$
(5) None of these

Q12. The ratio of the number of students studying in schools A, B and C is 5 : 8 : 4 respectively. If the number of students studying in each of the schools is increased by 20%, 25% and 30% respectively, what will be the new respective ratio of the students in schools A, B and C?
(1) 13 : 25 : 15
(2) 20 : 25 : 13
(3) 15 : 25 : 13
(4) Cannot be determined
(5) None of these

Q13. When 30% of one number is subtracted from another number, the second number reduces to its own four-fifth. What is the ratio between the first and the second numbers respectively?
(1) 4 : 7
(2) 3 : 2
(3) 2 : 5
(4) Cannot be determined
(5) None of these

Q14. The largest and the second largest angles of a triangle are in the ratio of 3 : 2 respectively. The smallest angle is 20% of the sum of the largest and the second largest angles. What is the sum of the smallest and the second largest angles?
(1) 80°
(2) 60°
(3) 100%
(4) 90°
(5) None of these

Q15. The ratio between the angles of a quadrilateral is 7 : 2 : 5 : 6 respectively. What is the sum of double the smallest angle and half the largest angle of the quadrilateral?
(1) 162°
(2) 198°
(3) 99°
(4) 135°
(5) None of these

Q16. The angles of a quadrilateral are in the ratio of 2 : 4 : 7 : 5. The smallest angle of the quadrilateral is equal to the smallest angle of a triangle. One of the angles of the triangle is twice the smallest angle of the triangle. What is the second largest angle of the triangle?
(1) 80°
(2) 60°
(3) 120°
(4) Cannot be determined
(5) None of these
Q17. The ratio between the angles of a quadrilateral is 3 : 4 : 6 : 7. Half the second largest angle of the quadrilateral is equal to the smaller angle of a parallelogram. What is the value of adjacent angle of the parallelogram?
(1) 136°
(2) 126°
(3) 94°
(4) 96°
(5) None of these

Q18. The ratio between the three angles of a quadrilateral is 1 : 4 : 5 respectively. The value of the fourth angle of the quadrilateral is 60°. What is the difference between the value of the largest and the smallest angles of the quadrilateral?
(1) 120°
(2) 90°
(3) 110°
(4) 100°
(5) None of these

Q19. Mr. Pandit owned 950 gold coins all of which he distributed amongst his three daughters Lalita, Amita and Neeta. Lalita gave 25 gold coins to her husband, Amita donated 15 gold coins and Neeta made jewellery out of 30 gold coins. The new respective ratio of the coins left with them was 20 : 73 : 83. How many gold coins did Amita receive from Mr. Pandit?
(1) 380 (2) 415
(3) 400 (4) 350
(5) None of these

Q20. The largest and the second largest angles of a triangle are in the ratio of 13 : 12 respectively. The smallest angle is 20% of the sum of the largest and the second largest angles. What is the sum of the smallest and the second largest angles?
(1) 120°
(2) 108°
(3) 100° (4) 102°
(5) None of these

Q21. Twenty five percent of Pranab’s annual salary is equal to eighty percent of Surya’s annual salary. Surya’s monthly salary is forty percent of Dheeru’s monthly salary. If Dheeru’s annual salary is Rs 6 lacs, what is Pranab’s monthly salary? (At some places annual income and in some place monthly income are given)
(1) Rs 7.68 lacs
(2) Rs 56,000
(3) Rs 8.4 lacs
(4) Rs 64,000
(5) None of these

Q22. The ratio between the three angles of a quadrilateral is 1 : 6 : 2 respectively. The value of the fourth angle of the quadrilateral is 45°. What is the difference between the value of the largest and the smallest angles of the quadrilateral?
(1) 165°
(2) 140°
(3) 175°
(4) 150°
(5) None of these

Q23. The ratio between the angles of a quadrilateral is 3 : 4 : 6 : 5. Two-third of the largest angle of the quadrilateral is equal to the smaller angle of a parallelogram. What is the value of adjacent angle of the parallelogram?
(1) 120°
(2) 110°
(3) 100°
(4) 130°
(5) None of these

Q24. Rohit has some 50 paisa coins, some 2 rupee coins, some 1 rupee coins and some 5 rupee coins. The value of all the coins is Rs 50. Number of 2 rupee coins is 5 more than that of the 5 rupee coins. 50 paisa coins are double in number than 1 rupee coins Value of 50 paisa coins and 1 rupee coins is Rs 26. How many 2 rupee coins does he have?
(1) 4
(2) 2
Q25. The ratio between the adjacent angles of a parallelogram is 2 : 3 respectively. Half the smaller angle of the parallelogram is equal to the smallest angle of a quadrilateral. Largest angle of quadrilateral is four times its smallest angle. What is the sum of largest angle of quadrilateral and the smaller angle of parallelogram.
(1) 252°  
(2) 226°  
(3) 144°  
(4) 180°  
(5) None of these

Q26. One of the angles of a triangle is two-third of sum of adjacent angles of parallelogram. Remaining angles of the triangle are in ratio 5 : 7 respectively. What is the value of second largest angle of the triangle ?
(1) 25°  
(2) 40°  
(3) 35°  
(4) Cannot be determined  
(5) None of these

Q27. The largest and the smallest angles of a triangle are in the ratio of 3 : 1 respectively. The second largest angle of the triangle is equal to 44°. What is the value of 150 per cent of the largest angle of the triangle ?
(1) 149  
(2) 129  
(3) 153  
(4) 173  
(5) None of these

Q28. One of the angles of a quadrilateral is thrice the smaller angle of a parallelogram. The respective ratio between the adjacent angles of the parallelogram is 4 : 5. Remaining three angles of the quadrilateral are in ratio 4 : 11 : 9 respectively. What is the sum of the largest and the smallest angles of the quadrilateral ?
(1) 255°  
(2) 260°  
(3) 265°  
(4) 270°  
(5) None of these

Q29. Smallest angle of a triangle is equal to two-third of the smallest angle of a quadrilateral. The ratio between the angles of the quadrilateral is 3 : 4 : 5 : 6. Largest angle of the triangle is twice its smallest angle. What is the sum of second largest angle of the triangle and largest angle of the quadrilateral ?
(1) 160°  
(2) 180°  
(3) 190°  
(4) 170°  
(5) None of these

Q30. The largest and the second largest angles of a triangle are in the ratio of 4 : 3 respectively. The smallest angle is half the largest angle. What is the difference between the smallest and the largest angles of the triangle?  
(1) 30°  
(2) 60°  
(3) 40°  
(4) 20°  
(5) None of these

Q31. The ratio between the three angles of a quadrilateral is 13 : 9 : 5 respectively. The value of the fourth angle of the quadrilateral is 36°. What is the difference between the largest and the second smallest angles of the quadrilateral?  
(1) 104°  
(2) 108°  
(3) 72°  
(4) 96°  
(5) None of these

Q32. The ratio between the adjacent angles of a parallelogram is 7 : 8 respectively. Also the ratio between the angles of quadrilateral is 5 : 6 : 7 : 12. What is the sum of the smaller angle of
Q32. Parallelogram and second largest angle of the quadrilateral?
(1) 168°
(2) 228°
(3) 156°
(4) 224°
(5) None of these

Q33. The ages of Sulekha and Arunima are in the ratio of 9 : 8 respectively. After 5 years the ratio of their ages will be 10 : 9. What is the difference in years between their ages.
(1) 4 years
(2) 5 years
(3) 6 years
(4) 7 years
(5) None of these

Q34. The ages of Sonal and Nitya are in the ratio of 9 : 5 respectively. After 8 years the ratio of their ages will be 13 : 9. What is the difference in years between their ages?
(1) 4 years
(2) 12 years
(3) 6 years
(4) 14 years
(5) None of these

Q35. The ratio of the ages of a father and son is 17 : 7 respectively. 6 years ago the ratio of their ages was 3 : 1 respectively. What is the father’s present age?
(1) 64
(2) 51
(3) 48
(4) Cannot be determined
(5) None of these

Q36. Ratio of Rani’s and Komal’s age is 3 : 5 respectively. Ratio of Komal’s and Pooja’s age is 2 : 3 respectively. If Rani is two-fifth of Pooja’s age, what is Rani’s age?
(1) 10 years
(2) 15 years
(3) 24 years
(4) Cannot be determined

Q37. Present ages of Amit and his father are in the ratio of 2 : 5 respectively. Four years hence the ratio of their ages becomes 5 : 11 respectively. What was father’s age five years ago?
(1) 40 years
(2) 45 years
(3) 30 years
(4) 35 years
(5) None of these

Q38. Four years ago Shyam’s age was \(\frac{3}{4}\) times that of Ram. Four years hence, Shyam’s age will be \(\frac{5}{6}\) times that of Ram. What is the present age of Shyam?
(1) 15 years
(2) 20 years
(3) 16 years
(4) 24 years
(5) 8 years

Q39. The ratio of the ages of Tina and Rakesh is 9 : 10 respectively. Ten years ago the ratio of their ages was 4 : 5 respectively. What is the present age of Rakesh?
(1) 25 years
(2) 20 years
(3) 30 years
(4) 24 years
(5) None of these

Q40. The present ages of Vishal and Shekhar are in the ratio of 14 : 17 respectively. Six years from now, their ages will be in the ratio of 17 : 20 respectively. What is Shekhar’s present age?
(1) 17 years
(2) 51 years
(3) 34 years
(4) 28 years
(5) None of these

Q41. The ratio between the ages of a father and a son at present is 5 : 2 respectively. Four years hence the ratio between the ages of the son and
his mother will be 1 : 2 respectively. What is the ratio between the present ages of the father and the mother respectively?

(1) 3 : 4  
(2) 5 : 4  
(3) 4 : 3  
(4) Cannot be determined  
(5) None of these

Q42. Radha’s present age is three years less than twice her age 12 years ago. Also the respective ratio between Raj’s present age and Radha’s present age is 4 : 9. What will be Raj’s age after 5 years ?

(1) 12 years  
(2) 7 years  
(3) 21 years  
(4) Cannot be determined  
(5) None of these

Q43. The ratio of the present ages of Meena and Fiona is 16 : 13 respectively. Four years ago the respective ratio of their ages was 14 : 11. What will be Fiona’s age four years from now ?

(1) 28 years  
(2) 32 years  
(3) 26 years  
(4) 36 years  
(5) None of these

Q44. The respective ratio of the present ages of Swati and Trupti is 4 : 5. Six years hence the respective ratio of their ages will be 6 : 7. What is the difference between their ages ?

(1) 2 years  
(2) 3 years  
(3) 4 years  
(4) Cannot be determined  
(5) None of these

Q45. The respective ratio between the present ages of Ram and Rakesh is 6 : 11. Four years ago the ratio of their ages was 1 : 2 respectively. What will be Rakesh’s age after five years ?

(1) 45 years  
(2) 29 years  
(3) 49 years  
(4) Cannot be determined  
(5) None of these

Q46. The respective ratio between the present ages of son, mother, father and grandfather is 2 : 7 : 8 : 12. The average age of son and mother is 27 years. What will be mother’s age after 7 years ?

(1) 40 years  
(2) 41 years  
(3) 48 years  
(4) 49 years  
(5) None of these

Q47. The respective ratio between the present ages of Ram, Rohan and Raj is 3 : 4 : 5. If the average of their present ages is 28 years then what would be the sum of the ages of Ram and Rohan together after 5 years ?

(1) 45 years  
(2) 55 years  
(3) 52 years  
(4) 59 years  
(5) None of these

Q48. The respective ratio between present age of Manoj and Wasim is 3 : 11. Wasim is 12 years younger than Rehana. Rehana’s age after 7 years will be 85 years. What is the present age of Manoj’s father who is 25 years older than Manoj ?

(1) 43 years  
(2) 67 years  
(3) 45 years  
(4) 69 years  
(5) None of these

Q49. The respective ratio between the present age of Aarti and Savita is 5 : x. Aarti is 9 years younger than Jahnavi. Jahnavi’s age after 9 years will be 33 years. The difference between Savita’s and Aarti’s age is same as the present age of Jahnavi. What will come in place of x ?
Q50. An amount of money is to be divided among P, Q and R in the ratio of 3 : 5 : 7 respectively. If the amount received by R is Rs 4,000 more than the amount received by Q, what will be the total amount received by P and Q together?

(1) Rs. 8,000
(2) Rs. 12,000
(3) Rs. 16,000
(4) Cannot be determined
(5) None of these
Solution

Q1. Option(1)
Let the initial seats for Maths Physics and Biology be 5x, 7x and 8x respectively.
Now, new seats for Maths = \(\frac{5x \times 140}{100}\)
For physics = \(\frac{7x \times 150}{100}\)
and for biology = \(\frac{8x \times 175}{100}\)
Required ratio = \(5 \times 140 : 7 \times 150 : 8 \times 175\)
= \(2 : 3 : 4\)

Q2. Option (1)
Ratio of rent’s sharing
= 8 : 12 : 14 = 4 : 6 : 7
Total rent = Rs. 578
Share of Kiara = \(\frac{7}{17} \times 578 = Rs. 238\)

Q3. Option (2)
From the options,
2x + 3x + 4x + 5x = 1400
=> 14x = 1400 => x = 100
shares are : Rs. 200, Rs. 300.
Rs. 400 and Rs. 500.
Hence, total sum = 200 + 300 + 400 + 500
= Rs. 1400

Q4. Option (1)
Let the number of students in Arts, Commerce and Science be 3x, 5x and 8x respectively.
On increasing their respective numbers,
Required ratio = 3x × \(\frac{120}{100}\) : 5x × \(\frac{140}{100}\) : 8x × \(\frac{125}{100}\)

Q5. Option (1)
Let x boys and x girls joined the group.
According to the question,
= 20 + x + 25 + x = 45 + 2x
= 45 + 2 × 15 = 75

Q6. Option (3)
Let the amounts received by A, B, C and D be Rs. 3x, 4x, 9x, and Rs. 10x respectively.
According to the question,
9x - 4x = 2580
\(\Rightarrow\) 5x = 2580
\(\Rightarrow\) x = \(\frac{2580}{5}\) = 516
Total amount of the money of A and D
= 3x + 10x
= 13x = 13 × 516 = Rs. 6708

Q7. Option (3)
Let the production of company B = 100 units
Production of company A = 120 units
Production of company C
\(\frac{120 \times 100}{80}\) = 150 units
Required ratio = 120 : 100 : 150
= 12 : 10 : 15

Q8. Option (5)
Let the original number of students in Arts and Science faculties be 5x and 8x respectively.
According to the question,
5x + 150 = 3
8x + 80 = 4
\(\Rightarrow\) 24x + 240 = 20x + 600
\(\Rightarrow\) 4x = 360
\(\Rightarrow\) x = \(\frac{360}{4}\) = 90
Original number of students
= 5x + 8x = 13x
= 13 × 90 = 1170

Q9. Option (4)
Let the number be x and y respectively
\(\frac{75x}{100}\) = \(\frac{5y}{8}\)
\(\Rightarrow\) \(\frac{x}{y}\) = \(\frac{5}{8}\) \(\frac{100}{75}\) = \(\frac{5}{6}\)

Q10. Option (1)
x : 336 = 400 : 192
\(\Rightarrow\) x × 192 = 336 × 400
\[ x = \frac{336 \times 400}{192} = 700 \]

Q11. Option(4)
\[ \frac{32}{a} = \frac{b}{2} = \frac{32}{a} = \frac{b}{2} \]
\[ \Rightarrow 32 : a = b : 2 \]
\[ \Rightarrow ab = 64 \]

Q12. Option(3)
Required Ratio = \[ \frac{5 \times 120}{100} : \frac{8 \times 125}{100} : \frac{4 \times 130}{100} \]
= 15 : 25 : 13

Q13. Option(5)
let the numbers be \( x \) and \( y \) respectively.
According to the question
\[ x \times 30 = 4y \]
\[ \Rightarrow \frac{y}{5} = \frac{3x}{10} \]
\[ \Rightarrow \frac{x}{y} = \frac{3 \times 5}{3 \times 5} = 2 : 3 \]

Q14. Option(4)
Tricky approach
If the largest and the second largest angles be \( 3x^\circ \) and \( 2x^\circ \), respectively then, third angle = \( x \)
\[ x + 2x + 3x = 180^\circ \]
\[ x = 30^\circ \]
Required sum = \( x + 2x = 3x = 90^\circ \)

Q15. Option(4)
\[ 7x + 2x + 5x + 6x = 360^\circ \]
\[ \Rightarrow 20x = 360^\circ \]
\[ \Rightarrow x = \frac{360}{20} = 18^\circ \]
\[ \Rightarrow \text{Required answer} = 2 \times 2x + \frac{7x}{2} \]
\[ = \frac{15x}{2} = \frac{(15 \times 18)}{2} = 135^\circ \]

Q16. Option(2)
\[ 2x + 4x + 7x + 5x = 360^\circ \]
\[ \Rightarrow 18x = 360^\circ \]
\[ \Rightarrow x = \frac{360}{18} = 20^\circ \]
Smallest angle of the triangle = \( 2 \times 20^\circ = 40^\circ \)
Second angle = \( 2 \times 40^\circ = 80^\circ \)

Q17. Option(3)
\[ 3x + 4x + 6x + 7x = 360^\circ \]
\[ \Rightarrow 20x = 360^\circ \]
\[ \Rightarrow x = 18^\circ \]
Smaller angle of the parallelogram = \( \frac{6x}{2} = 3x = 54^\circ \)
Adjacent angle of parallelogram
= \( 180^\circ - 54^\circ = 126^\circ \)

Q18. Option(1)
\[ x + 4x + 5x + 60 = 360^\circ \]
\[ \Rightarrow 10x = 300^\circ \]
\[ \Rightarrow x^\circ = 30^\circ \]
Required difference = \( 5x - x = 4x \)
\[ = 4 \times 30 = 120^\circ \]

Q19. Option(1)
\[ 20x + 73x + 83x = 950 - 25 - 15 - 30 \]
\[ \Rightarrow 176x = 880 \]
\[ \Rightarrow x = \frac{880}{176} = 5^\circ \]
Number of coins got by Amita = \( 73x + 15 \)
\[ = 73 \times 5 + 15 = 380 \]

Q20. Option(4)
Sum of three angles of a triangle = \( 180^\circ \)
Largest angle = \( 13x^\circ \)
Second largest angle = \( 12x^\circ \)
Third angle = \( (13x + 12x) \times \frac{1}{5} = 5x^\circ \)
\[ 13x + 12x + 5x = 180^\circ \]
\[ \Rightarrow 30x = 180^\circ \]
\[ \Rightarrow x = \frac{180}{30} = 6^\circ \]
Required sum = \( 5x + 12x = 17x = 17 \times 6 = 102^\circ \)

Q21. Option(4)
\[ \frac{25}{100} \times \frac{25}{100} = \frac{80}{100} \times \frac{16}{5} \]
\[ \Rightarrow \frac{Pranab}{Surya} = \frac{80}{16} = \frac{16}{5} \]
Pranab : Surya = 16 : 5

\[ \frac{Dheeru}{Surya} = \frac{40}{100} = \frac{2}{5} \]
Surya : Dheeru = 2 : 5
Pranab : Surya : Dheeru
= 16 × 2 : 5 × 2 : 5 × 5
= 32 : 10 : 25
Now,
25 = 600000
32 = \frac{600000}{25} × 32
= Rs. 768000 = Pranab’s annual income
Pranab’s monthly salary
= \frac{768000}{12} = Rs 64000

Q22. Option(3)
Sum of the angles of quadrilateral = 360°
\Rightarrow x + 6x + 2x + 45 = 360°
\Rightarrow 9x = 360 - 45 = 315°
\Rightarrow x = \frac{315}{9} = 35°

Q23. Option(3)
Sum of the angles of a quadrilateral = 360°
3x + 4x + 6x + 5x = 360°
\Rightarrow 8x = 360°
\Rightarrow x = 20°
The largest angle of the quadrilateral
= 6 × 20 = 120°
Smaller angle of parallelogram
= 120 × \frac{2}{3} = 80°

Q24. Option(3)
If the number of 2-rupee coins be x, then
number of 5 rupee coins = x - 5
\Rightarrow 2x + 5(x - 5) = 50 - 26
\Rightarrow 2x + 5x - 25 = 24
\Rightarrow 7x = 24 + 25 = 49
\Rightarrow x = \frac{49}{7} = 7

Q25. Option(5)
If the adjacent angles of parallelogram be 2x° and 3x° respectively, then
2x° + 3x° = 180°
\Rightarrow 5x° = 180°
\Rightarrow x° = 36°
Smaller angle of parallelogram
= 2x° = 72°
Smallest angle of the quadrilateral = 36°

Its largest angle = 4 × 36 = 144°
Required sum = 144 + 72 = 216°

Q26. Option(3)
Sum of adjacent angles of a parallelogram = 180°
One of the angles of triangle
= \frac{2}{3} × 180° = 120°
Sum of three angles of a triangle = 180°
5x + 7x = 180° - 120°
\Rightarrow 12x = 60
\Rightarrow x = 5
Second angle of triangle = 5 × 5 = 25°
Third angle of triangle = 7 × 5 = 35°
The second largest angle of triangle = 35°

Q27. Option(3)
Sum of angles of a triangle = 180°
\Rightarrow 3x + x + 44 = 180°
\Rightarrow 4x = 180 - 44 = 136°
\Rightarrow x = \frac{136}{4} = 34°
Largest angle of triangle = 3 × 34 = 102°
150% of 102 = \frac{102 × 150}{100} = 153°

Q28. Option(2)
For the Parallelogram,
4x° + 5x° = 180°
\Rightarrow 9x = 180°
\Rightarrow x = \frac{180}{9} = 20°
Smaller angle of parallelogram = 4 × 20 = 80°
One angle of the quadrilateral = 3 × 80 = 240°
4y + 11y + 9y = 360 - 240 = 120°
\Rightarrow 24y = 120°
\Rightarrow y = \frac{120}{24} = 5°

Q29. Option(2)
Sum of the angles of quadrilateral = 360°
3x + 4x + 5x + 6x = 360°
\Rightarrow 18x = 360°
\Rightarrow x = \frac{360}{18} = 20°
Smallest angle of quadrilateral = 3 × 20 = 60°
Largest angle of quadrilateral = 6 × 20 = 120°
Smallest angle of triangle = $60 \times \frac{2}{3} = 40^\circ$
Largest angle of triangle = $2 \times 40 = 80^\circ$
Third angle of triangle = $180^\circ - 40^\circ - 80^\circ = 60^\circ$
Required answer = $60 + 120 = 180^\circ$

Q30. Option(3)
The smallest angle of triangle is half of the largest angle.
Ratio of three angles = $4 : 3 : 2$
$4x + 3x + 2x = 180$
$x = 20$
Required difference = $4x - 2x = 2x = 2 \times 20 = 40^\circ$

Q31. Option(4)
Let the three angles of quadrilateral be $13x^\circ$, $9x^\circ$ and $5x^\circ$ respectively.
$13x + 9x + 5x = 360 - 36$
$27x = 324^\circ$
$x = \frac{324}{27} = 12^\circ$
Required difference = $13x - 5x = 8x$
$= 8 \times 12 = 96^\circ$

Q32. Option(1)
Let the adjacent angles be $7x^\circ$ and $8x^\circ$.
$7x + 8x = 180^\circ$
$x = 15^\circ$
Smaller angle = $7 \times 12 = 84^\circ$
Again, $5y + 6y + 7y + 12y = 360^\circ$
$30y = 360^\circ$
$y = \frac{360}{30} = 12^\circ$

Q33. Option(2)
Let the present ages of Sulekha and Arunima be $9x$ and $8x$ years respectively.
According to the question,
After 5 years,
$\frac{9x+5}{8x+5} = \frac{10}{9}$
$\Rightarrow 81x + 45 = 80x + 50$
$\Rightarrow x = 5$
Required difference = $9x - 8x = x = 5$ years

Q34. Option(5)
Let the present ages of Sonal and Nitya be $9x$ and $5x$ years respectively.
According to the question,
$\frac{9x+8}{5x+8} = \frac{13}{9}$
$\Rightarrow 81x + 72 = 65x + 104$
$\Rightarrow 81x - 65x = 104 - 72$
$\Rightarrow 16x = 32$
$\Rightarrow x = \frac{32}{16} = 2$

Q35. Option(2)
Let the present ages of father and son be $17x$ years and $7x$ years respectively.
According to the question,
$\frac{17x-6}{7x-6} = \frac{3}{1}$
$\Rightarrow 21x - 18 = 17x - 6$
$\Rightarrow 4x = 12$
$\Rightarrow x = \frac{12}{4} = 3$
Father’s present age = $17 \times 3 = 51$ years

Q36. Option(4)
Rani : Komal = $3 : 5 = 6 : 10$
Komal : Pooja = $2 : 3 = 10 : 15$
Rani : Komal : Pooja = $6 : 10 : 15$
We have insufficient data to solve this question.

Q37. Option(4)
Let the present ages of Amit and his father be $2x$ years and $5x$ years respectively.
$2x + 4 = \frac{5}{5x + 4} = \frac{11}{1}$
$\Rightarrow 25x + 20 = 22x + 44$
$\Rightarrow 3x = 24$
$\Rightarrow x = \frac{24}{3} = 8$
Father’s age 5 years ago = $5x - 5$
$= 5 \times 8 - 5 = 35$ years

Q38. Option(3)
Four years ago,
Shyam : Ram = $3 : 4$
3x + 8 = 5
\[ \frac{4x + 8}{6} \]
\[ 20x + 40 = 18x + 48 \]
\[ 2x = 48 - 40 = 8 \]
\[ x = \frac{8}{2} = 4 \]
Shyam’s present age = 3x + 4 = 3 \times 4 + 4 = 16 years

Q39. Option(2)

Let the present ages of Tina and Rakesh be 9x and 10x years respectively.
10 years ago,
9x - 10 = 4
10x - 10 = 5
\[ 45x - 50 = 40x - 40 \]
5x = 10
\[ x = \frac{10}{5} = 2 \]
Rakesh’s present age = 10x = 10 \times 2 = 20 years.

Q40. Option(3)

Let the present ages of Vishal and Shekhar be 14x and 17x years respectively.
After 6 years,
14x + 6 = 17
17x + 6 = 20
\[ 280x + 120 = 289x + 102 \]
9x = 18
\[ x = 2 \]
Shekhar’s present age = 17x = 17 \times 2 = 34 years

Q41. Option(4)

Let the present ages of father and son be 5x and 2x years respectively.
After 4 years,
Son’s age = y years
and mother’s age = 2y years
\[ y = 2x + 4 \]
\[ x = \frac{y - 4}{2} \]
Father’s present age = \frac{5(y - 4)}{2} years
Mother’s present age = (2y - 4) years
Clearly, data is inadequate.

Q42. Option(5)

Let Radha’s present age = x years.
\[ x = 2(x - 12) - 3 \]
\[ x = 2x - 24 - 3 \]
\[ x = 27 \]
Raj’s present age = \frac{4}{9} \times 27 = 12 years
Raj’s age after 5 years = 12 + 5 = 17 years

Q43. Option(5)

Let the present ages of Meena and Fiona be 16x and 13x years respectively.
According to the question,
\[ 176x - 44 = 182x - 56 \]
\[ 182x - 176x = 56 - 44 \]
\[ 6x = 12 \]
\[ x = 2 \]
Fiona’s age after four years = 13x + 4 = 13 \times 2 + 4 = 30 years

Q44. Option(2)

Let Swati’s present age = 4x years
Trupti’s present age = 5x years
\[ 30x + 36 = 28x + 42 \]
\[ 2x = 42 - 36 = 6 \]
\[ x = 3 \] difference of their ages

Q45. Option(3)

Let Ram’s present age be 6x years and that of Rakesh be 11x years.
Four years ago,
\[ 12x - 8 = 11x - 4 \]
\[ x = 8 - 4 = 4 \]
Rakesh’s age after five years = 11x + 5 = 11 \times 4 + 5 = 49 years

Q46. Option(4)

According to the question,
\[ 2x + 7x \]
\[ = 27 \]
9x = 27 \times 2 = 54
\Rightarrow x = \frac{54}{9} = 6

Mother’s age after 7 years = 7x + 7
= 7 \times 6 + 7 = 49 years

Q47. Option(4)
Let the present ages of Ram, Rohan and Raj be 3x, 4x and 5x years respectively.
3x + 4x + 5x = 3 \times 28
\Rightarrow 12x = 84
\Rightarrow x = \frac{84}{12} = 7

Sum of the ages of Ram and Rohan after 5 years
= 3x + 4x + 10 = 7x + 10
= 7 \times 7 + 10 = 59 years

Q48. Option(1)
Rehana’s present age = 85 - 7 = 78 years
Wasim’s present age = 78 - 12 = 66 years
Manoj’s present age = \frac{3}{11} \times 66 = 18 years
Manoj’s father’s present age = 25 + 18 = 43 years

Q49. Option(5)
Jahnavi’s present age = 33 - 9 = 24 years
Aarti’s present age = 24 - 9 = 15 years
Now, Aarti : Savita = 5 : x = 15 : 3x
Savita’s present age = 3x years
3x - 15 = 24
\Rightarrow 3x = 24 + 15 = 39
\Rightarrow x = \frac{39}{3} = 13

Q50. Option(3)
Let the amount received by P, Q and R be Rs. 3x, Rs. 5x and Rs. 7x respectively.
7x - 5x = 4000
\Rightarrow x = \frac{4000}{2} = 2000
Amount received by P and Q together
= 8x = 8 \times 2000 = Rs. 16000
RATIO & PROPORTION

Q1.
Seats for Maths, Physics and Biology are in the ratio of 5 : 7 : 8 respectively. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the respective ratio of increased seats?

(a) 2 : 3 : 4
(b) 6 : 7 : 8
(c) 6 : 8 : 9
(d) Cannot be determined
(e) None of these

Q2.
Samira, Mahira and Kiara rented a set of DVDs at a rent of Rs. 578. If they used it for 8 hours, 12 hours and 14 hours respectively, what is Kiara’s share of rent to be paid?

(a) Rs. 238
(b) Rs. 204
(c) Rs. 192
(d) Rs. 215
(e) None of these

Q3.
A sum of money is to be divided among four persons in the ratio of 2 : 3 : 4 : 5. Out of the four, one person gets Rs. 200 more than the other and Rs. 100 less than another. What is the sum?

(a) Rs. 2800
(b) 65

Q4.
In a college the number of students studying Arts, Commerce and Science are in the ratio of 3 : 5 : 8 respectively. If the number of students studying Arts, Commerce and Science is increased by 20%, 40% and 25% respectively, what will be the new ratio of students in Arts, Commerce and Science respectively?

(a) 18 : 35 : 50
(b) 3 : 10 : 10
(c) 4 : 8 : 5
(d) 32 : 35 : 25
(e) None of these

Q5.
20 boys and 25 girls form a group of social workers. During their membership drive, the same number of boys and girls joined the group (e.g. if 7 boys joined, 7 girls joined). How many members does the group have now, if the ratio of boys to girls is 7 : 8?

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

(a) 75
(b) 65
Q6.
A sum of money is divided among A, B, C and D in the ratio of 3 : 4 : 9 : 10 respectively. If the share of C is Rs. 2,580 more than the share of B, then what is the total amount of money of A and D together?
(a) Rs. 5,676
(b) Rs. 6,192
(c) Rs. 6,708
(d) Rs. 224
(e) None of these

Q7.
Production of company A is 120% of the production of company B and 80% of the production of company C, What is the ratio between the productions of companies A, B and C respectively?
(a) 6 : 5 : 9
(b) 6 : 5 : 4
(c) 12 : 10 : 15
(d) 10 : 12 : 15
(e) None of these

Q8.
Number of students in Arts and Science faculties in an institute are in the ratio of 5 : 8 respectively. If 150 more students join 'Arts' faculty while 80 more students join Science faculty, the respective ratio becomes 3 : 4. Originally what was the total number of students in both faculties together?
(a) 1200
(b) 1400
(c) 1150
(d) Cannot be determined
(e) None of these

Q9.
75% of a number is equal to 5/8th of another number. What is the ratio between the first number and the second number respectively?
(a) 5 : 4
(b) 6 : 5
(c) 4 : 5
(d) 5 : 6
(e) None of these

Q10.
In a test, a candidate secured 336 marks out of maximum marks 'x', If the maximum marks 'x' were converted into 400 marks, he would have secured 192 marks, What were the maximum marks of the test?
(a) 7001
(b) 750
(c) 500
(d) 650
(e) 800

Q11.
Which of the following represents ab = 64?
(a) 8 : a = 8 : b
(b) a : 16 = b : 4
(c) a : 8 = b : 8
(d) 32 : a = b : 2
(e) None of these
Q12.

The ratio of the number of students studying in school A, B and C is 5 : 8 : 4 respectively. If the number of students studying in each of the school is increased by 20%, 25% and 30% respectively, what will be the new respective ratio of the students in school A, B and C ?

(a) 13 : 25 : 15
(b) 20 : 25 : 13
(c) 15 : 25 : 13
(d) Cannot be determined
(e) None of these

Q13.

When 30% of one number is subtracted from another number, the second number reduces to its own four-fifth. What is the ratio between the first and the second numbers respectively?

(a) 4 : 7
(b) 3 : 2
(c) 2 : 5
(d) Cannot be determined
(e) None of these

Q14.

The largest and the second largest angles of a triangle are in the ratio of 3 : 2 respectively. The smallest angle is 20% of the sum of the largest and the second largest angles. What is the sum of the smallest and the second largest angles ?

(a) 80
(b) 60
(c) 100

Q15.

The ratio between the angles of a quadrilateral is 7 : 2 : 5 : 6 respectively. What is the sum of double the smallest angle and half the largest angle of the quadrilateral?

(a) 162
(b) 198
(c) 99
(d) 135
(e) None of these

Q16.

The angles of a quadrilateral are in the ratio of 2 : 4 : 7 : 5. The smallest angle of the quadrilateral is equal to the smallest angle of a triangle. One of the angles of the triangle is twice the smallest angle of the triangle. What is the second largest angle of the triangle?

(a) 80
(b) 60
(c) 120
(d) Cannot be determined
(e) None of these

Q17.

The ratio between the angles of a quadrilateral is 3 : 4 : 6 : 7. Half the second largest angle of the quadrilateral is equal to the smaller angle of a parallelogram. What is the value of adjacent angle of the parallelogram ?

(a) 136
Q18. The ratio between the three angles of a quadrilateral is 1 : 4 : 5 respectively. The value of the fourth angle of the quadrilateral is 60. What is the difference between the value of the largest and the smallest angles of the quadrilateral?

(a) 120
(b) 90
(c) 110
(d) 100
(e) None of these

Q19. Mr. Pandit owned 950 gold coins all of which he distributed amongst his three daughters Lalita, Amita and Neeta. Lalita gave 25 gold coins to her husband, Amita donated 15 gold coins and Neeta made jewellery out of 30 gold coins. The new respective ratio of the coins left with them was 20 : 73 : 83. How many gold coins did Amita receive from Mr. Pandit?

(a) 380
(b) 350
(c) 400
(d) 350
(e) None of these

Q20. The largest and the second largest angles of a triangle are in the ratio of 13 : 12 respectively. The smallest angle is 20% of the sum of the largest and the second largest angles. What is the sum of the smallest and the second largest angles?

(a) 120
(b) 108
(c) 100
(d) 102
(e) None of these

Q21. Twenty five percent of Pranab's annual salary is equal to eighty percent of Surya's annual salary. Surya's monthly salary is forty percent of Dheeru's monthly salary. If Dheeru's annual salary is Rs. 6 lacs, what is Pranab's monthly salary?

(a) Rs. 7.68 lacs
(b) Rs. 56,000
(c) Rs. 8.4 lacs
(d) Rs. 64,000
(e) None of these

Q22. The ratio between the three angles of a quadrilateral is 1 : 6 : 2 respectively. The value of the fourth angle of the quadrilateral is 45. What is the difference between the value of the largest and the smallest angles of the quadrilateral?

(a) 165
(b) 140

(e) None of these
Q23. The ratio between the angles of a quadrilateral is 3 : 4 : 6 : 5. Two-thirds of the largest angle of the quadrilateral is equal to the smaller angle of a parallelogram. What is the value of the adjacent angle of the parallelogram?

(a) 120°
(b) 110°
(c) 100°
(d) 130°
(e) None of these

Q24. Rohit has some 50 paisa coins, some 2 rupee coins, some 1 rupee coins and some 5 rupee coins. The value of all the coins is Rs. 50. Number of 2 rupee coins is 5 more than that of the 5 rupee coins. 50 paisa coins are double in number than 1 rupee coins. Value of 50 paisa coins and 1 rupee coins is Rs. 26. How many 2 rupee coins does he have?

(a) 4
(b) 2
(c) 7
(d) Cannot be determined
(e) None of these

Q25. The ratio between the adjacent angles of a parallelogram is 2 : 3 respectively. Half the smaller angle of the parallelogram is equal to the smallest angle of a quadrilateral. Largest angle of quadrilateral is four times its smallest angle. What is the sum of largest angle of quadrilateral and the smaller angle of parallelogram?

(a) 252°
(b) 226°
(c) 144°
(d) 180°
(e) None of these

Q28. The largest and the smallest angles of a triangle are in the ratio of 3 : 1 respectively. The second largest angle of the triangle is equal to 44. What is the value of 150 percent of the largest angle of the triangle?

(a) 149
(b) 129
(c) 153
(d) 173
(e) None of these
One of the angles of a quadrilateral is thrice the smaller angle of a parallelogram. The respective ratio between the adjacent angles of the parallelogram is 4:

5. Remaining three angles of the quadrilateral are in ratio 4 : 11 : 9 respectively. What is the sum of the largest and the smallest angles of the quadrilateral?

(a) 255
(b) 260
(c) 265
(d) 270
(e) None of these

Q29.
Smallest angle of a triangle is equal to two-third of the smallest angle of a quadrilateral. The ratio between the angles of the quadrilateral is 3 : 4 : 5 : 6. Largest angle of the triangle is twice its smallest angle. What is the sum of second largest angle of the triangle and largest angle of the quadrilateral?

(a) 160
(b) 180
(c) 190
(d) 170
(e) None of these

Q30.
The largest and the second largest angles of a triangle are in the ratio of 4 : 3 respectively. The smallest angle is half the largest angle. What is the difference between the smallest and the largest angles of the triangle?

(a) 30
(b) 60
(c) 40
(d) 20
(e) None of these

Q31.
The ratio between the three angles of a quadrilateral is 13 : 9 : 5 respectively. The value of the fourth angle of the quadrilateral is 36. What is the difference between the largest and the second smallest angles of the quadrilateral?

(a) 104
(b) 108
(c) 72
(d) 96
(e) None of these

Q32.
The ratio between the adjacent angles of a parallelogram is 7 : 8 respectively. Also the ratio between the angles of quadrilateral is 5 : 6 : 7 : 12. What is the sum of the smallest angle of parallelogram and second largest angle of the quadrilateral?

(a) 168
(b) 228
(c) 156
(d) 224
(e) None of these

Q33.
The age of Sulekha and Aruni-ma are in the ratio of 9 : 8 respectively. After 5 years the ratio of their age will be 10 : 9. What is the difference (in years) between their age?

(a) 4 years  
(b) 5 years  
(c) 6 years  
(d) 7 years  
(e) None of these

Q34.

The age of Sonal and Mitya are in the ratio of 9 : 5 respectively. After 8 years the ratio of their age will be 13 : 9. What is the difference (in years) between their age?

(a) 4 years  
(b) 12 years  
(c) 6 years  
(d) 14 years  
(e) None of these

Q35.

The ratio of the age of a father and son is 17 : 7 respectively. 6 years ago the ratio of their age was 3 : 1 respectively. What is the father’s present age?

(a) 64 yrs  
(b) 51 yrs  
(c) 48 yrs  
(d) Cannot be determined  
(e) None of these

Q36.

Ratio of Rani’s and Komal’s age is 3 : 5 respectively. Ratio of Komal's and pooja's age is 2 : 3 respectively. If Rani is two-fifth of, Pooja’s age, what is Rani’s age?

(a) 10 years  
(b) 15 years  
(c) 24 years  
(d) Cannot be determined  
(e) None of these

Q37.

Present age of Amit and his father are in the ratio of 2 : 5 respectively. Four years hence the ratio of their age becomes 5 : 11 respectively. What was father’s age five years ago?

(a) 40 years  
(b) 45 years  
(c) 30 years  
(d) 35 years  
(e) None of these

Q38.

Four years ago Shyam’s age was ¾ times that of Ram. Four years hence, Shyam’s age will be 5/6 times that of Ram. What is the present age of Shyam?

(a) 15 years  
(b) 20 years  
(c) 16 years  
(d) 24 years
Q39. The ratio of the age of Tina and Rakesh is 9 : 10 respectively. Ten years ago the ratio of their age was 4 : 5 respectively. What is the present age of Rakesh?

(a) 25 years  
(b) 20 years  
(c) 30 years  
(d) 24 years  
(e) None of these

Q40. The present age of Vishal and Shekhar are in the ratio of 14 : 17 respectively. Six years from now, their age will be in the ratio of 17 : 20 respectively, What is Shekhar’s present age?

(a) 17 years  
(b) 51 years  
(c) 34 years  
(d) 28 years  
(e) None of these

Q41. The ratio between the age of a father and a son at present is 5 : 2 respectively. Four years hence the ratio between the age of the son and his mother will be 1 : 2 respectively. What is the ratio between the present age of the father and the mother respectively?

(a) 3 : 4  
(b) 5 : 4  
(c) 4 : 3  
(d) Cannot be determined  
(e) None of these

Q42. Radha’s present age is three years less than twice her age 12 years ago. Also the respective ratio between Raj’s present age and Radha’s present age is 4 : 9. What will be Raj’s age after 5 years?

(a) 12 years  
(b) 7 years  
(c) 21 years  
(d) Cannot be determined  
(e) None of these

Q43. The ratio of the present age of Meena and Fiona is 16 : 13 respectively. Four years ago the respective ratio of their age was 14 : 11. What will be Fiona’s age four years from now?

(a) 28 years  
(b) 32 years  
(c) 26 years  
(d) 36 years  
(e) None of these

Q44. The respective ratio of the present age of Swati and Trupti is 4 : 5. Six years hence the respective ratio of their age will be 6 : 7. What is the difference between their age?

(a) 2 years
Q45. The respective ratio between the present age of Ram and Rakesh is 6 : 11. Four years ago the ratio of their age was 1 : 2 respectively. What will be Rakesh’s age after five years?

(a) 45 years  
(b) 29 years  
(c) 49 years  
(d) Cannot be determined  
(e) None of these

Q46. The respective ratio between the present age of son, mother, father and grandfather is 2 : 7 : 8 : 12. The average age of son and mother is 27 years. What will be mother’s age after 7 years?

(a) 40 years  
(b) 41 years  
(c) 48 years  
(d) 49 years  
(e) None of these

Q47. The respective ratio between the present age of Ram, Rohan and Raj is 3 : 4 : 5. If the average of their present age is 28 years then what would be the sum of the age of Ram and Rohan together after 5 years?

(a) 45 years  
(b) 55 years  
(c) 52 years  
(d) 59 years  
(e) None of these

Q48. The respective ratio between present age of Manoj and Wasim is 3 : 11. Wasim is 12 years younger than Rehana. Rehana’s age after 7 years will be 85 years. What is the present age of Manoj’s father who is 25 years older than Manoj?

(a) 43 years  
(b) 67 years  
(c) 45 years  
(d) 69 years  
(e) None of these

Q49. The respective ratio between the present age of Aarti and Savita is 5 : x. Aarti is 9 years younger than Jahnavi. Jahnavi’s age after 9 years will be 33 years. The difference between Savita’s and Aarti’s age is same as the present age of Jahnavi. What will (come in place of x)?

(a) 21  
(b) 37  
(c) 17  
(d) Cannot be determined  
(e) None of these
Q50. An amount of money is to be divided among P, Q and R in the ratio of 3 : 5 : 7 respectively. If the amount received by R is Rs.4,000 more than the amount received by Q, what will be the total amount received by P and Q together?

(a) Rs. 8,000
(b) Rs. 12,000
(c) Rs. 16,000
(d) Cannot be determined
(e) None of these

Q51. Rita Invested 25% more than Sunil. Sunil invested 30% less than Abhinav who invested Rs. 6,000. What is the respective ratio between the amount that Rita invested and the total amount invested by all of them together?

(a) 35 : 104
(b) 13 : 29
(c) 101 : 36
(d) 35 : 103
(e) None of these

Q52. When X is subtracted from the numbers 9, 15 and 27, the remainders are in continued proportion. What is the value of X?

(a) 8
(b) 6
(c) 4
(d) 5

Q53. A certain amount was to be distributed among A, B and C in the ratio 2 : 3 : 4 respectively, but was erroneously distributed in the ratio 7 : 2 : 5 respectively. As a result of this, B got Rs. 40 less. What is the amount?

(a) Rs. 210
(b) Rs. 270
(c) Rs. 230
(d) Rs. 280
(e) None of these

Q54. A particular sum was divided among A, B and C in the ratio 2 : 6 : 7 respectively. If the amount received by A was Rs. 4,908, what was the difference between the amount received by B and C?

(a) Rs. 2,454
(b) Rs. 3,494
(c) Rs. 2,135
(d) Rs. 2,481
(e) None of these

Q55. The average age of a man and his son is 30 years. The ratio of their age four years ago was 10 : 3 respectively. What is the difference between the present age of the man and his son?

(a) 28 years
(b) 16 years
(c) 26 years
(d) 44 years
Q56.

A sum of Rs. 221 is divided among X, Y, and Z such that X gets Rs. 52 more than Y. Y gets 26 more than Z. The ratio of the shares of X, Y, and Z respectively is: (a) 9 : 5 : 3
(b) 9 : 3 : 5
(c) 5 : 9 : 3
(d) 10 : 6 : 5
(e) None of these

Q57.

The average weight of boys in a class is 45 kg while that of girls is 36 kg. The average weight of the whole class is 42.25 kg. What is the respective ratio between the number of boys and girls in the class?
(a) 11 : 25
(b) 25 : 11
(c) 25 : 12
(d) 12 : 25
(e) None of these

Q58.

If 50% of a certain number is equal to 3/4th of another number, what is the ratio between the numbers?
(a) 3 : 2
(b) 2 : 5
(c) 5 : 2

Q59.

The ratio of the present age of Mahesh and Ajay is respectively 3 : 2. After 8 years, ratio of their age will be 11 : 8. What will be the present age of Mahesh's son if his age is half of the present age of Ajay?
(a) 12 years
(b) 24 years
(c) 18 years
(d) 9 years
(e) None of these

Q60.

A vessel contains 64 litres of mixture of milk and water in the ratio 7 : 3 respectively. 8 litres of mixture is replaced by 12 litres of milk. What is the ratio of milk and water in the resulting mixture?
(a) 64 : 21
(b) 35 : 22
(c) 64 : 23
(d) 65 : 21
(e) None of these

Q61.

There was a science exhibition in an auditorium. On the first day 14 persons visited the exhibition, on the second day 12 persons and on the third day only 10 persons visited the exhibition. The ratio of admission fees collected from each of them on these days was 2 : 3 : 5 respectively. If the total amount collected on these three days was Rs. 4560, what amount was collected on the first day?
Q62. The ratio of present ages of P and Q is 8 : After 4 years their ages will be in the ratio 4 : 3 respectively. What will be the ratio of P’s age after 7 years from now and Q’s age now?

(a) 3 : 2  
(b) 1 : 2  
(c) 2 : 1  
(d) 3 : 1  
(e) None of these

Q63. 15 years ago the average age of a family of four members was 40 years. Two children were born in that span of 15 years. The present average age of the family remained unchanged. Among the two children who were born in between the 15 years. If the older child at present is 8 years more than the younger one, what is the respective ratio between the present age of the older child and the present age of the younger child?

(a) 9 : 4  
(b) 7 : 3  
(c) 7 : 6  
(d) 7 : 4  
(e) 9 : 5

Q64. 4 years ago, the respective ratio between ½ of A’s age at that time and four times of B’s age at that time was 5 : 12. Eight years hence 1/2 of A’s age at that time will be less than B’s age at that time by 2 years. What is B’s present age?

(a) 10 years  
(b) 14 years  
(c) 12 years  
(d) 5 years  
(e) 8 years

Q65. The present age of Bob is equal to Abby’s age 8 years ago. Four years hence, the respective ratio between Bob’s age and Abby’s age will be 4 : 5 at that time. What is Bob’s present age?

(a) 24 years  
(b) 32 years  
(c) 40 years  
(d) 20 years  
(e) 28 years

Q66. Respective ratio between total number of students studying in College A and College B is 5 : 8. In College B, out of the total number of students, 5/8th is boys, out of which 60% study Commerce and the remaining 800 boys study in other streams. What is the total number of students in College A?

(a) 9 : 4  
(b) 7 : 3  
(c) 7 : 6  
(d) 7 : 4  
(e) 9 : 5
Q67. At present the respective ratio between the ages of A and B is 3 : 4 and that between A and C is 1 : 2. Six years hence, the sum of ages of A, B and C will be 96 years. What is the present age of A?
(a) 12 years
(b) 21 years
(c) 18 years
(d) 15 years
(e) 9 years

Q68. B is 8 years older than A and 8 years younger than C. 12 years hence, respective ratio of the ages of A and C will be 5 : 9. What is the sum of present ages of A, B and C?
(a) 58 years
(b) 46 years
(c) 48 years
(d) 60 years
(e) None of these

Q69. ‘B’ is 3 years older than A and ‘B’ is also 3 years younger than ‘C’. 3 years hence, the respective ratio between the ages of A and G will be 4 : 5. What is the sum of the present ages of A, B and C?
(a) 48 years
(b) 56 years
(c) 63 years
(d) 84 years

Q70. The present ages of Ranjana and Rakhi are in the ratio of 15 : 17 respectively. After 6 years, the respective ratio between the age of Ranjana and Rakhi will be 9 : 10. What will be the age of Ranjana after 6 years?
(a) Other than those given as options
(b) 40 years
(c) 34 years
(d) 30 years
(e) 36 years

Q71. If 7 boys and 2 men working together can do three times as much work per hour as a boy and a man together, what will be the respective ratio of work done by a boy and a man for the given time?
(a) 3 : 1
(b) 1 : 2
(c) 1 : 3
(d) 2 : 3
(e) 1 : 4

Q72. At present, the respective ratio between the ages of A and B is 3 : 4 and that between A and C is 1 : 2. Six years hence, the sum of the ages of A, B and C will be 96 years. What is the present age of A?
(a) 12 years
(b) 21 years
(c) 18 years
Q73. Four years ago, the respective ratio between the age of Ram and that of Sonu, was 4 : 9. Tina is ten years older than Ram. Tina is ten years younger than Sonu. What is Tina's present age?
(a) 40 years 
(b) 36 years 
(c) 30 years 
(d) 20 years 
(e) 42 years

Q74. When a number is added to a second number, the sum is 1000/3 percent of the second number. What is the ratio between the first number to the second number?
(a) 3 : 7 
(b) 7 : 4 
(c) 7 : 3 
(d) Data inadequate 
(e) None of these

Q75. A sum of money is to be distributed among F, Q and R in the ratio 6 : 19 : 7. If R gives 200 from his share to Q, the ratio of P, Q and R becomes 3 : 10 : 3, what is the total sum?
(a) Rs. 6400 
(b) Rs. 12800 
(c) Rs. 3200 
(d) Data inadequate 
(e) None of these

Q76. In a school the number of boys and that of the girls are in the respective ratio of 2 : 3. If the number of boys is increased by 20% and that of girls is increased by 10%, what will be the new ratio of number of boys to that of the girls?
(a) 4 : 5 
(b) 5 : 8 
(c) 3 : 4 
(d) Data inadequate 
(e) None of these

Q77. Income of two companies A and B are in the ratio of 5 : 8. Had the income of company A been more by Rs. 25 lakhs, the ratio of their income would have been 5 : 4 respectively. What is the income of company ‘B’?
(a) Rs. 80 lakhs 
(b) Rs. 50 lakhs 
(c) Rs. 40 lakhs 
(d) Rs. 60 lakhs 
(e) None of these

Q78. Ratio of the earnings of A and B is 4 : 7 respectively. If the earnings of A increase by 50% and the earnings of B decrease by 25% the new ratio of their earnings
Like Us : Facebook.com/GovernmentAdda

becomes 8 : 7 respectively. What are A's earnings ?
(a) Rs. 26,000
(b) Rs. 28,000
(c) Rs. 21,000
(d) Data inadequate
(e) None of these

Q79.

Salaries of A, B and C are in the ratio of 2 : 3 : 5 respectively. If their salaries were increased by 15%, 10% and 20% respectively what will be the new respective ratio of their salaries ?
(a) 3 : 3 : 10
(b) 23 : 33 : 60
(c) 10 : 11 : 20
(d) Can't be determined
(e) None of these

Q80.

Present age of Seema and Naresh are in the respective ratio of 5 : 7. Five years hence the ratio of their age becomes 3 : 4 respectively. What is Naresh's present age?
(a) 25
(b) 40
(c) 30
(d) Can not be determined
(e) None of these

Q81.

A and B together can complete a task in 15 days. B and C together can complete the same task in 20 days. A and C together can complete the same task in 30 days. What is the respective ratio of the number of days taken by A while completing the same task alone to the number of days taken by C while completing the same task alone?
(a) 2 : 3
(b) 1 : 4
(c) 3 : 1
(d) None of these

Q82.

A sum of money is divided among A, B, C and D in the ratio of 3 : 5 : 9 : 13 respectively. If the share of C is Rs. 2412 more than the share of A, then what is the total amount of money of B and D together?
(a) Rs. 4422
(b) Rs. 7236
(c) Rs. 6030
(d) Rs. 4,824
(e) None of these

Q83.

The age of Khushi and Jagriti are in the ratio of 5 : 8 respectively. After 8 years the ratio of their age will be 3 : 4. What is the difference in their age?
(a) 16 years
(b) 8 years
(c) 10 years
(d) 12 years
(e) None of these

Q81.

A and B together can complete a task in 15 days. B and C together can complete the same task in 20 days. A and C together can complete the same task in 30 days. What is the respective ratio of the number of days taken by A while completing the same task alone to the number of days taken by C while completing the same task alone?
(a) 2 : 3
(b) 1 : 4
(c) 3 : 1
(d) None of these

Q82.

A sum of money is divided among A, B, C and D in the ratio of 3 : 5 : 9 : 13 respectively. If the share of C is Rs. 2412 more than the share of A, then what is the total amount of money of B and D together?
(a) Rs. 4422
(b) Rs. 7236
(c) Rs. 6030
(d) Rs. 4,824
(e) None of these

Q83.

The age of Khushi and Jagriti are in the ratio of 5 : 8 respectively. After 8 years the ratio of their age will be 3 : 4. What is the difference in their age?
(a) 16 years
(b) 8 years
(c) 10 years
(d) 12 years
(e) None of these
Q84. The respective ratio of the present age of a mother and daughter is 7 : 1. Four years ago the respective ratio of their age was 19 : 1. What will be the mother’s age four years from now?

(a) 42 years  
(b) 38 years  
(c) 46 years  
(d) 36 years  
(e) None of these

Q85. Mr. X invested a certain amount in Debit and Equity funds in the ratio of 4 : 5 respectively. At the end of one year, he earned a total dividend of 30% on his investment. After one year he reinvested the amount including dividend in the ratio of 6 : 7 in Debit and Equity Funds. If the amount reinvested in Equity Funds was Rs. 94,500, what was the original amount invested in Equity Funds?

(a) Rs. 75,000  
(b) Rs. 81,007  
(c) Rs. 60,000  
(d) Rs. 65,007  
(e) None of these

ANSWERS:

1. (1) Let the initial seats for Maths, Physics and Biology be 5x, 7x, and 8x respectively,

Now, new seats for Maths = 5x × 140/100

For Physics = (7x × 150/100) and for Biology = 8x × 175/100

∴ Required ratio = (5x × 140)/100 : 7x × 150/100 : 8x × 175/100

= 5 × 140 : 7 × 150 : 8 × 175

= 2 : 3 : 4

2.(1) Ratio of rent’s sharing
Total rent = Rs. 578
Share of Kiara = \( \frac{7}{17} \times 578 = Rs. 238 \)

3.(2) From the options, if \( 2x + 3x + 4x + 5x = 1400 \)

\[ 14x = 1400 \]
\[ x = 100 \]

\[ \therefore \text{shares are: Rs. 200, Rs. 300, Rs. 400 and Rs. 500,} \]

Hence, total sum = 200 + 300 + 400 + 500 = Rs. 1400

4.(1) Let the number of students in Arts, Commerce and Science be 3\( x \), 5\( x \) and 8\( x \) respectively,

On increasing their respective numbers, Required ratio

\[ = 3x \times \frac{120}{100} : 5x \times \frac{140}{100} : 8x \times \frac{125}{100} \]
\[ = 360 : 700 : 1000 = 18 : 35 : 50 \]

5.(1) Let \( x \) boys and \( x \) girls joined the group. According to the question,

\[
\left( 20 + x \right) / \left( 25 + x \right) = 7/8
\]

\[ 160 + 8x = 175 + 7x \]
\[ 8x - 7x = 175 - 160 \]
\[ x = 15 \]

\[ \therefore \text{New number of members} \]
\[ = 20 + x + 25 + x = 45 + 2x \]
\[ = 45 + 2 \times 15 = 75 \]

6.(3) Let the amount received by A, B, C and D be Rs. 3\( x \), 4\( x \), 9\( x \) and Rs. 10\( x \) respectively.

According to the question, \( 9x - 4x = 2580 \)

\[ 5x = 2580 \]
\[ x = 2580/5 = 516 \]

7.(3) Let the production of company B = 100 units

\[ \therefore \text{Production of company A = 120 units} \]
\[ \text{Production of company C} = 120 \times \frac{100}{80} = 150 \text{ units} \]

8.(5) Let the original number of students in Arts and Science faculties be 5\( x \) and 8\( x \) respectively.

According to the question.

\[ 5x + 150/8x + 80 = \frac{3}{4} \]

\[ = 24x + 240 = 20x + 60 \]
\[ 4x + 240 = 20x + 600 \]
\[ 4x = 360 \]
\[ x = 360 \]
\[ x = 360 / 4 = 90 \]

\[ \therefore \text{Original number of students} = 5x + 8x = 13x \]
\[ = 13 \times 90 = 1170 \]

9.(4) Let the number be \( x \) and \( y \) respectively.

\[ : 75x/100 = 5y/8 \]
\[ x/y = 5/8 \times 100/75 \]
\[ = 5/6 \text{ or } 5:6 \]

10.(1) \( x : 336 = 400 : 192 \)

\[ = x \times 192 = 336 \times 400 \]

11.(4) \( 32/a = b/2 = ab = 64 \)

12.(3) Required ratio

\[ = 5 \times 120/100 : 8 \times 125/100 : 4 \times 130/100 \]
13.(5) Let the number be x and y respectively,

According to the question

\( y \div x \times \frac{30}{100} = \frac{4}{5}y = y/5 = 3x/10 \)

\( x:y = 10/(3 \times 5) = 2:3 \)

14.(4) (Tricky approach)

If the largest and the second largest angles be 3x˚ and 2x˚, respectively then,

third angle = x

\( \therefore \) Required sum

\[ x + 2x = 3x = 90˚ \]

\[ 7x + 2x + 5x + 6x = 360˚ \]

\[ 2x = 360˚ \]

\[ x = 360/20 = 18 \]

\( \therefore \) Required answer = 2 \times 2x + 7x/2

\[ 15x/2 = 15 \times 18/2 = 135˚ \]

16.(2) 2x + 4x + 7x + 5x = 360˚

\[ 18x = 360˚ \]

\[ x = 360/18 = 20˚ \]

\( \therefore \) Smallest angle of the triangle

\[ = 2 \times 20˚ = 40˚ \]

Second angle = 2 \times 40˚ = 80˚

\( \therefore \) Required angle

17.(2) 3x + 4x + 6x + 7x = 360˚

\[ = 20x = 360˚ \]

\[ x = 18˚ \]

\( \therefore \) Smaller angle of the parallelogram

\[ = 6x/2 = 3x = 54˚ \]

\( \therefore \) Adjacent angle of parallelogram

\[ = 180˚ - 54˚ = 126˚ \]

18.(1) x + 4x + 5x + 60 = 360˚

\[ = 10x = 300˚ \]

\[ x = 30 \]

\( \therefore \) Required difference = 5x – x

\[ = 4x = 4 \times 30 = 120˚ \]

19.(1) 20x + 73x + 83x = 360˚

\[ = 950 - 25 - 15 - 30 \]

\[ = 176x = 880 \]

\[ x = 880/176 = 5 \]

\( \therefore \) Number of coins got by Amita

\[ = 73x + 15 = 73 \times 5 + 15 = 380 \]

20.(4) Sum of three angles of a triangle = 180˚ Largest angle = 13x

Second largest angle = 12x

\( \therefore \) Third angle

\[ = (13x + 12x) \times 1/5 = 5x \]

\[ = 13x + 12x + 5x = 180˚ \]

\[ = 30x = 180˚ \]

\[ x = 180/30 = 6˚ \]

\( \therefore \) Required sum = 5x + 12x
21. (4) Pranab × 25/100 = Surya × 80/100
= Pranab/ Surya = 80/25 = 16/5 Pranab : Surya = 16 : 5
Surya/ Dheeru = 40/100 = 2/5 Surya : Dheera = 2 : 5
Pranab : Surya : Dheeru
= 16 : 2 : 5 × 2 : 5 × 5
= 32 : 10 : 25
Now,
∴ 25 = 600000
∴ 32 = 600000/25 × 32
= Rs. 768000 = Pranab’ annual income
∴ Pranab’s monthly salary
= 768000/12 = Rs. 64000
22. (3) Sum of the angles of quadrilateral = 360˚
= x + 6x + 2x + 45 = 360
= 9x = 360– 45 = 315
= x = 315/9 = 35
23. (3) Sum of the angles of a quadrilateral = 360˚
∴ 3x + 4x + 6x + 5x = 360˚
= 18x = 360˚
x = 20˚
∴ The largest angle of the quadrilateral = 6 × 20 = 120˚
∴ Smaller angle of parallelogram
= 120 × 2/3 = 80˚
∴ Its adjacent angle
= 180 – 80 = 100˚
24. (3) If the number of 2 rupee coins be x, then number
of 5 rupee cons = x – 5
∴ 2x + 5 (x - 5) = 50 – 26
= 2x + 5x – 25 = 24
= 7x = 24 + 25 = 49
x = 49/7 = 7
25. (5) Let the adjacent angles of parallelogram be 2x˚
and 3x˚ respectively, then
2x˚ + 3x˚ = 180˚
= 5x˚ = 180˚ = x˚ = 36˚
∴ Smallest angle of parallelogram
= 2x˚ = 72˚
= smallest angle of the quadrilateral = 36˚
∴ Its largest angle = 4 × 36 = 144˚
∴ Required sum = 144 + 72 = 216˚
26. (3) Sum of adjacent angles of a parallelogram = 180˚
∴ One of the angles of triangle
= 2/3 × 180˚ = 120˚
Sum of three angles of a triangle
= 180˚ ∴ 5x + 7x = 180 – 120
= 12x = 60
x = 5
Second angle of triangle
= 5 × 5 = 25˚
Third angle of triangle
= 7 × 5 = 35˚
27.(3) Sum of angles of a triangle = 180˚

= 3x + x + 44 = 180

= 4x = 180 – 44 = 136 x = 136/4 = 34

∴ Largest angle of triangle

= 3 × 34 = 102˚

∴ 150% of 102 = 102 × 150/100 = 153

28.(2) For the Parallelogram, 4x˚ + 5x˚ = 180˚

= 9x = 180

x = 180/9 = 20

Smaller angle of parallelogram

= 4 × 20 = 80˚

∴ One angle of quadrilateral

= 3 × 80 = 240˚

Now, 4y + 11y + 9y

= 360 – 240 = 120

= 24 y = 120

= y = 120/24 = 5

= Its smallest angle

= 4 × 5 = 20˚

∴ Required sum

= 240˚ + 20˚ = 260˚

29.(2) Sum of the angles of quadrilateral = 360˚

∴ 3x + 4x + 5x + 6x = 360

= 18x = 360

x = 360/18 = 20

∴ Smallest angle of quadrilateral = 3 × 20 = 60˚

Largest angle of quadrilateral

= 6 × 20 = 120˚

∴ smallest angle of triangle

= 60 × 2/3 = 40˚

Largest angle of triangle

= 2 × 40 = 80˚

∴ Third angle of triangle

= 180˚ - 40˚ - 80˚ = 60˚

∴ Required sum

= 360˚ + 60˚ = 260˚

30.(3) The smallest angle of triangle is half of the largest angle.

∴ Ratio of three angles = 4 : 3 : 2

Now, 4x + 3x + 2x = 180

= 9x = 180

= x = 20

∴ Required difference

= 4x – 2x = 2x
31.(4) Let the three angle of quadrilateral be $13x^\circ 9x + 5x = 360 - 36$

$27x = 324$x = $324/27 = 12$

$\therefore$ Required difference

$= 13x - 5x = 8x = 8 \times 12 = 96^\circ$

32.(1) Let the adjacent angles be $7x^\circ + 8 = 180$

$= 15x = 180 \times 12 = 12$

$\therefore$ Smaller angle = $7 \times 12 = 84^\circ$ Again, $5y + 6y + 7y + 12y = 360^\circ$

$= 30y = 360^\circ$

$y = 360^\circ/30 = 12^\circ$

$\therefore$ Second largest angle of ht quadrilateral = $7 \times 12 = 84^\circ$

$\therefore$ Required sum = $84 + 84 = 168^\circ$

33.(2) Let the present age of Sulekha and Arunima be $9x$ and $8x$ years respectively.

According to the question,

After 5 years, $(9x + 5)/(8x + 5)$

$= 10/9$

$= 81x + 45 = 80x + 50$

$= 81x - 80x = 50 - 45$

$x = 5$ years

34.(5) Let the present age of Sonal and Nitya be $9x$ and $5x$ years respectively

According to the question

$= (9x + 8)/(5x + 8) = 13/9$

$= 81x + 72 = 65x + 104$

$= 81x - 65x = 104 - 72$

$= 16x = 32$

$\therefore$ Required difference

$= 9x - 5x = 4x = 4 \times 2 = 8$ years

35.(2) Let the present age of father and son be $17x$ and $7x$ years respectively.

According to the question.

$(17x - 6)/(7x - 6) = 3/1$

$= 21x - 18 = 17x - 6$

$= 5x = 12$

$x = 12/4 = 3$

$\therefore$ Father’s present age

$= 17 \times 3 = 51$ years

36.(4) Rani : Komal = $3 : 5 = 6 : 10$

Komal : Pooja = $2 : 3 = 10 : 15$

$\therefore$ Rani : Komal : Pooja = $6 : 10 : 15$

We have insufficient data to solve this questions.

37.(4) Let the present age of Amit and his father be $2x$ years and $5x$ years respectively.

$\therefore (2x + 4)/(5x + 4) = 5/11$

$= 25x + 20 = 22x + 44$

$= 3x = 24$

$x = 24/3 = 8$

$\therefore$ Father’s age 5 years ago

$= 5x - 5 = 5 \times 8 - 5 = 35$ years

38.(3) Four years ago, Shyam : Ram = $3 : 4$ After four years,
\[
\frac{3x + 8}{4x + 8} = \frac{5}{6}
\]

\[
20x + 40 = 18x + 48 \quad 2x = 48 - 40 = 8
\]

\[
x = \frac{8}{2} = 4
\]

\[\therefore \text{Shyam's present age} = 3x + 4 = 3(4) + 4 = 16 \text{ years}\]

39.(2) Let the present age of Tina and Rakesh be \(9x\) and \(10x\) years respectively.

10 years ago,

\[
\frac{(9x - 10)}{(10x - 10)} = \frac{4}{5}
\]

\[
45x - 50 = 40x - 40 \quad 5x = 10
\]

\[
x = \frac{10}{5} = 2
\]

\[\therefore \text{Rakesh's present age} = 10x = 10 \times 2 = 20 \text{ years}\]

40.(3) Let the present age of Vishal and Shekhar be \(14x\) and 17 years respectively.

After 6 years

\[
\frac{(14x + 6)}{(17x + 6)} = \frac{17}{20}
\]

\[
280x + 120 = 9x = 18x = \frac{18}{9} = 2
\]

\[\text{Shekhar's present age} = 17 \times 2 = 34 \text{ years}\]

41.(4) Let the present age of father and son be \(5x\) and \(2x\) years respectively,

After 4 years,

\[\text{Son's age} = y \text{ years} \quad \therefore \text{Father's present age} = 5(y - 4)/2 \text{ years Now, } y = 2x + 4 \]

\[\text{and mother's age} = 2y \text{ years} \quad \therefore \text{Father's present age} = 5(y - 4)/2 \text{ years Now, } y = 2x + 4 \]

\
\[
= x = (y - 4)/2
\[
= 5(y - 4)/2 \text{ Years Mother's present age}
\]

\[\therefore \text{Father's present age} = 5(y - 4)/2 \text{ years Now, } y = 2x + 4 \]

42.(5) Let Radha’s present age

\[= x \text{ years} \quad \therefore \text{Raj’s present age} = 4/9 \times 27 = 12 \text{ years} \]

\[\therefore \text{Raj’s age after 5 years} = x = (y - 4)/2 \]

43.(5) Let the present age of Meena and Fiona be \(16x\) and \(13x\) years respectively.

According to the question,

\[
\frac{(16x - 4)}{(13x - 4)} = \frac{14}{11}
\]

\[
176x - 44 = 182x - 56
\]

\[
6x = 12
\]

\[
x = 2
\]

\[\therefore \text{Fiona’s age after four years} = 13x + 4 = 13 \times 2 + 4 = 30 \text{ years}\]

44.(4) Let Swati’s present age

\[= 4x \text{ years} \quad \therefore \text{Swati’s present age} = 4x \text{ years}\]
Trupati’s present age = 5x years

∴ \((4x + 6)/(5x + 6)\)

= 6/7

= 30x + 36 = 28x + 42

= 2x = 42 – 36 = 6

= x = 3 = difference of their age

45.(3) Let Ram’s present age be 6x years and that of Rakesh be 11x years.

Four year ago,

(6x - 4)/(11x - 4) = \(\frac{1}{2}\)

= 12x – 8 = 11x – 4 x= 8 – 4 = 4

∴ Rakesh’s age after five years

= 11x + 5

= 11 × 4 + 5 = 49 years

46.(4) According to the question, \((2x + 7x)/2 = 27\)

= 9x = 27 × 2 = 54 x= 54/9 = 6

∴ Mother’s age after 7 Years

= 7x + 7 = 7 × 6 + 7 = 49 years

47.(4) Let the present age of Ram, Rohan and Raj be 3x, 4x and 5x years respectively.

∴ 3x + 4x + 5x = 3 × 28

= 12x = 84

= x = 84/12 = 7

Sum of the age of Ram and Rohan after 5 years

= 3x + 4x + 10 = 7x + 10

= 7 × 7 + 10 = 59 years

48.(1) Rehana’s present age

= 85 – 7 = 78 years

Wasim’s present age

= 78 – 12 = 66 years

∴ Manoj’s present age

= 3/11 × 66 = 18 years

49.(5) Jahnavi’s present age

= 33 – 9 = 24 years

∴ Aarti’s present age

= 24 – 9 = 15 years

Now, Aarti : Savita = 5 : x

∴ Savita’s present age

= 15 : 3x

= 3x – 15 = 24

∴ 3x = 24 + 15 = 39

= x = 39/3 = 13

50.(3) Let the amount received by P, Q and R be Rs. 3x, Rs. 5x and Rs. 7x respectively.

∴ 7x – 5x = 4000

x = 4000 / 2 = 2000

∴ Amount received by P and Q together = 8x

= 8 × 2000 = Rs. 16000

51.(4) Abhinav’s investment

= Rs. 6000

Sunil’s investment = 70 × 6000/100

= Rs. 4200

Rita’s investment = 4200 × 125/100

= Rs. 5250
Like Us: Facebook.com/GovernmentAdda  
Join Us: Telegram.me/GovtAdda

Required ratio

\[= 5250 : (6000 + 4200 + 5250)\]

\[= 5250 : 15450 = 35 : 103\]

52. (5) \((9 - x)/(15 - x) = (15 - x)/(27 - x)\)

\[= 243 - 9x - 27x + x^2 225 - 30x + x^2\]

\[= 6x = 243 - 225 = 18\]

\[= x = 3\]

53. (1) Let the amount be Rs. \(x\),

\[\times (3/9 - 2/14)x = 40\]

\[= (1/3 - 1/7)x = 40 = (7 - 3/21)x = 40\]

\[= x = (40 \times 21)/4 = Rs. 210\]

54. (1) If the total amount be Rs. \(x1\), then \(2x/15 = 4908\)

\[x = (4908 \times 15)/2 = Rs. 36810\]

\[\therefore \text{Required difference} = 7 - 6/15 \times 36810 = Rs. 2454\]

55. (1) Four years ago,

Let, Father’s age = \(10x\) years Son’s age = \(3x\) years

\[\therefore 10x + 3x + 8 = 60\]

\[= 13x = 60 - 8 = 52\]

\[= x = 4\]

\[\therefore \text{Required difference} = 7x = 7 \times 4 = 28\text{ years}\]

56. (1) \(x = y + 52\)

\[z = y - 26\]

\[\therefore x + y + z = 221\]

\[2x = 88 - 64 = 24\]

\[= x = 12\]

57. (2) Number of boys = \(x\) (let) Number of girls = \(y\) (let)

\[\times (45 \times x + 36 \times y)/(x + y) = 42.25\]

\[= 45x + 36y = 42.25x + 42.25y\]

\[= 45x - 42.25x = 42.25y - 36y\]

\[= x/y = 6.25 = 25/11\]

58. (1) Let, First number = \(x\) Second number = \(y\)

\[\times (x/2 = y \times 4 / 4)\]

\[= x/2 = 3/2 \times 2 = 3/2 \text{ or } 3 : 2\]

59. (1) Let, Mahesh = \(3x\) years Ajay = \(2x\) years

After 8 years,

\[(3x + 8)/(2x + 8) = 11/8\]

\[= 24x + 64 = 22x + 88\]
∀ Ajay’s age = 2x = 2 × 12
= 24 years

∀ Age of Mahesh’s son
= ½ × 24 = 12 years

60.(1) In 64 litres of mixture, Milk = 7/10 × 64 = 44.8 litres
Water = 64 – 44.8 = 19.2 litres
In 8 litres of mixture,
Milk = 7/10 × 8 = 5.6 litres
Water = 2.4 litres
In resulting mixture milk = 44.8 – 5.6 + 12
= 51.2 litres
Water = 19.2 – 2.4
= 16.8 litres

∴ Required ratio = 51.2 : 16.8
= 64 : 21

61.(1) Ratio of amount collected
= (14 × 2) : (12 × 3) : (10 × 5)
= 28 : 36 : 50 = 14 : 18 : 25
Sum of ratio = 14 + 18 + 25
= 57

∴ Amount collected on day one
=14/57 × 4560 = Rs. 1120

62.(4) P’s present age = 8x years
Q’s present age = 5x years

After 4 years,
(8x + 4)/(5x + 4) = 4/3
= 24x + 12 = 20x + 16
= 24x – 20x = 16 – 12
= 4x = 4
(10x + 4 + 8)/2 – (3x + 4 + 8)
= x = 1
P’s age 7 years hence =8x + 7
= 8 + 7 = 15 years

Required ratio = 15 : 5 = 3 : 1

63.(2) Present age of younger child = x years
Present age of older child = (x + 8) years
Sum of the present ages of 4 member family
= (4 × 40 + 4 × 15) years
= (160 + 60) years = 220 years
Sum of present ages of 6 members
= 6 × 40 = 240 years

∴ Sum of the present ages of children
= 240 – 220 = 20 years

∴ x + x + 8 = 20
= 2x = 20 – 8 = 12
x = 6 years

∴ Present age of older child
= 6 + 8 = 14 years

∴ Required ratio = 14 : 6
= 7 : 3

64.(1) 4 years ago, A’s age = 10 years, B’s age = 3x years
A’s present age
= (10x + 4) years
B’s present age = (3x + 4) years

According to the question,
Like Us : Facebook.com/GovernmentAdda

= -2
= 3x + 12 – (5x + 6) = 2

= 3x + 12 – 5x – 6 = 2
= 5 – 2x = 2
= 2x = 6 – 2 = 4

x = 2
∴ B’s present age = 3x + 4
= 3 × 2 + 4 = 10 years

65.(5) Bob’s present age = x years (let)
∴ Abby’s present age
= (x + 8) years
According to the question,
After to the question, After 4 years
= (x + 4)/(x + 12) = 4/5
= 5x + 20 = 4x + 48
= 5x – 4x = 48 – 20
x = 28 years

66.(5) Total number of students in college A= 5x Total number of students in college B = 8x
In college B,
Boys = 5/8 × 8x = 5x
Boys who study commerce
= 5x × 60/100 = 3x
Boys in other streams
= 5x– 3x =2x
∴ 2x = 800 x = 400
∴ Total number of students in college A
B = A + 3 = A = B – 3 and B = C – 3 = C = B + 3
∴ Total number of students in college A

Join Us: Telegram.me/GovtAdda

= 5x = 5 × 400 = 2000
= 67.(3) A : B = 3 : 4

A : C = 1 : 2 = 3 : 6
∴ A : B : C= 3 : 4 : 6
6 years hence,

67.3) A : B = 3 : 4

68.(3) Let A’s present age be x years.
∴ B’s present age = (x+ 8) years C’s present age = (x+ 16) years After 12 years,
A’s age/ C’s age = 5/9
= (x +12)/(x+ 16 + 12)
= 5/9
= 9x + 108 = 5x + 140
= 9x – 5x = 140 – 108
= 4x = 32
x= 32/4 = 8
∴ Sum of the present age of A, B and C
= x + x + 8 + x + 16
= 3x + 24 = 3 × 8 + 24
= 48 years
69.(5) According to the question, Again, after 3 years, (B - 3 + 3)/(B + 3 + 3) = 4/5
= B/ B+ 6 = 4/5
= 5B = 4B + 24
= 5B − 4B = 24
∴ A : B : C = 3 : 4 : 6

According to the question, After 6 years
Sum of ages of A, B and C = 96
= 3x + 4x + 6x + 18 = 96
= 13x = 96 − 18 = 78
= x = 78/13 = 6
∴ A’s present age = 3x
= 3 × 6 = 18 years

Ranjana’s present age = 15x years
Rakhi’s present age = 17x years After 6 years,
(15x + 6)/(17x + 6) = 9/10
= 153x + 54 = 150x + 60
= 153x − 150x = 60 − 54
= 3x = 6
x = 2
∴ Ranjana’s age after 6 years
= 15x + 6
= (15 × 2 + 6) years = 36 years

71.(5) 7 boys + 2 men
= 3 boys + 3 men
= 4 boys=1 man
∴ Required ratio =1 : 4

72.(3) A : B = 3 : 4

Total sum = 6x + 19x + 7x = 32x 6x : 19x + 200 : 7x − 200
We can write $6x = 7x - 200 \Rightarrow x = 200$

$\therefore \text{Total Sum} = 32x = \text{Rs. 6400}$

76.(5) Ratio of no. boys: Girls = 2 : 3
Let the no. of boys = 2x Then the no. of girls = 3x

No. of boys after 20% increase
$= 1.20 \times 2x = 2.4x.$

No. of girls after 10% increase
$= 1.10 \times 3x = 3.3x$

Required ratio = $2.4x/3.3x = 8/11 = 8 : 11$

77.(3) $A : B = 5 : 8$
Let A’s income be 5x and B’s income be 8x According to question

$(5x + 25)/8x = 5/4$

$= 5(x + 5)/4 \times 2x = 5/4$

=$(x + 4)/2x = 1$

$x + 5 = 2x \Rightarrow x = 5$

B’s income = $8x = 8 \times 5 \text{ Rs. 40 lakhs}$

78.(4) Let the earnings of A and B Rs. 4x and 7x respectively. After 50% of 4x

After 25% decrease
B’s earning = 75% of 7x

Ratio = 150% of 4x : 75% of 7x

$= 8 : 7$

79.(2) Let the salaries of A, B and C be Rs. 2x, Rs. 3x and 5x respectively.

After respective increase of 15%, 10% and 20% their salaries will be

$115 \times 2x/100, 110 \times 3x/100 \text{ and } 120 \times 5x/100$

$\therefore \text{Required ratio}$

$= 115 \times 2x/100 : 110 \times 3x/100 : 120 \times 5x/100$

$= 23 : 33 : 60$

80.(5) Let the present age of Seema and Naresh be 5x and 7x years respectively.

According to the question,

$(5x + 5)/7x + 5 = 3/4$

$= 21x + 15 = 20x + 20$

$x = 20 - 15 = 5$

$\therefore \text{Naresh’s present age}$

$= 7x \text{ years} = 7 \times 5 = 35 \text{ years}$

81.(3) (A + B)’s 1 day’s work = $1/15 \text{ (B + C)’s 1 day’s work} = 1/20$

(C + A)’s 1 day’s work = $1/30$

On adding all three,

$2(A + B + C)’s \text{ 1 day’s work}$

$= 1/15 + 1/20 + 1/30$

$= (4 + 3 + 2)/60 = 9/60 = 3/20$

$\therefore (A + B + C)’s \text{ 1 day’s work} = 3/40$

$\therefore A’s \text{ 1 day’s work} = 3/40 - 1/20$

$= 3 - 2/40 = 1/40$
84.(3) Let the age of the mother and daughter be 7x and x years respectively.

\[ \therefore \text{Four years ago, } \frac{7x - 4}{x - 4} = \frac{19}{1} \]

\[ = 19x - 76 = 7x - 4 \]

\[ = 12x = 72 \rightarrow x = 6 \]

\[ \therefore \text{Mother’s age after four years} \]

\[ = 7x + 4 = 7 \times 6 + 4 = 46 \text{ years} \]

85.(1) Let the original amount invested in Debits and Equity fund be 4x and 5x respectively.

Dividend at the end of the year

\[ = 9x \times \frac{30}{100} = \frac{27x}{10} \]

Total investment after one year

\[ = Rs. \left(9x + \frac{27x}{10}\right) = Rs. \left(\frac{117x}{10}\right) \]

Total investment after one year

\[ = Rs. \left[9x + \left(\frac{27x}{10}\right)\right] = Rs. \left(\frac{117x}{10}\right) \]

\[ \therefore 7/13 \times \frac{117x}{10} = 94500 \]

\[ = x = \frac{94500 \times 13 \times 10}{7 \times 117} \]

\[ = 15000 \]

\[ \therefore \text{The original amount invested in Equity funds} = 5x \]

\[ = 5 \times 75000 \]

\[ = Rs. 75000 \]