



50+ Ratio and Proportion Questions PDF (English)

SSC Ratio and Proportion Questions and Solution (English)

1. Three numbers are in the ratio 3 : 5 : 11. If the sum of the first and the third is greater than the second by 333. The sum of three numbers is :

- A. 741
- B. 703
- C. 1197
- D. None of these

Ans: B

Sol:

Let the common factor be x .

So, the numbers are $3x$, $5x$ and $11x$

According to question,

$$3x + 11x = 5x + 333$$

$$\Rightarrow 9x = 333$$

$$\Rightarrow x = 37$$

$$\text{Sum of all the three numbers} = 3x + 5x + 11x = 19x = 19 \times 37 = 703$$

2. Rs 13450 are to be distributed between B and A such that B gets Rs 3400 less than

A. The ratio of the amount received by A to that received by B is

- A. 296 : 117
- B. 7 : 3
- C. 337 : 201
- D. 199 : 105

Ans: C

Sol:

Let the amount received by A is Rs A .

Then, amount received by B = Rs $(A - 3400)$

Given, $A + B = \text{Rs } 13450$

$$A + (A - 3400) = 13450$$

$$A = 8425; B = 5025$$

$$\text{Required ratio} = 8425 : 5025 = 337 : 201$$

3. The fourth proportional to 0.15, 0.27 and 16 is

- A. 22.6
- B. 33.7
- C. 25.5
- D. 28.8



Ans: D

Sol:

Let the fourth proportional be x .

Then, $0.15 : 0.27 :: 16 : x$

$$0.15x = 0.27 \times 16$$

$$x = 4.32/0.15 = 28.8$$

4. Which of the following is the smallest fraction

A. $19/27$

B. $7/13$

C. $11/15$

D. $12/23$

Ans: D

Sol:

$$19/27 = 0.7$$

$$7/13 = 0.53$$

$$11/15 = 0.7$$

$$12/23 = 0.52$$

Hence, $12/23$ is the smallest fraction.

5. A company employs experts, amateurs and novices in the proportion $2 : 7 : 11$ and the wages of an expert, an amateur and a novice are in the ratio $7 : 4 : 2$. When 33 novices are employed, the total monthly remuneration of all amounts to ₹ 1881600. Find the monthly remuneration of a person in each category of employees.

A. ₹ 63000, ₹ 36000, ₹ 18000

B. ₹ 68600, ₹ 39200, ₹ 19600

C. ₹ 66500, ₹ 38000, ₹ 19000

D. ₹ 67900, ₹ 38800, ₹ 19400

Ans: B

Sol:

Let the monthly remuneration of an expert be ₹ $7x$.

Then, monthly remuneration of an amateur = $(7x) \times \frac{2}{7} = 4x$

And monthly remuneration of a novice = $(7x) \times \frac{2}{7} = 2x$

Now, given, 33 novices are employed.

Then, the number of experts = $33 \times \frac{2}{11} = 6$



$$\text{And the number of amateurs} = 33 \times \frac{7}{11} = 21$$

Total monthly remuneration of all employees = ₹ 1881600

$$\Rightarrow 6 \times (7x) + 21 \times (4x) + 33(2x) = 1881600$$

$$\Rightarrow 42x + 84x + 66x = 1881600$$

$$\Rightarrow 192x = 1881600$$

$$\Rightarrow x = \frac{1881600}{192} = 9800$$

Now, monthly remuneration of an expert = $7 \times 9800 = ₹ 68600$,

And Monthly remuneration of an amateur = $4 \times 9800 = ₹ 39200$

And monthly remuneration of a novice = $2 \times 9800 = ₹ 19600$

6. A person divided a certain sum between his three sons in the ratio 1 : 3 : 5. Had he divided the sum in the ratio $1:\frac{1}{3}:\frac{1}{5}$ the son, who got the least share earlier, would

have got ₹1456 more. The sum (in ₹) was:

- A. 2691
- B. 2961
- C. 2916
- D. 2196

Ans: A

Sol:

Let the total sum be $207x$.

Then, actual distribution,

$$\text{Sum of ratios} = 1 + 3 + 5 = 9$$

$$\text{First son} = (207x) \times \frac{1}{9} = 23x$$

$$\text{Second son} = (207x) \times \frac{3}{9} = 69x$$

$$\text{Third son} = (207x) \times \frac{5}{9} = 115x$$

$$\text{New ratio } 1:\frac{1}{3}:\frac{1}{5} = \frac{15:5:3}{15} = 15 : 5 : 3$$

$$\text{Sum of ratios} = 15 + 5 + 3 = 23$$

New distribution,

$$\text{First son} = (207x) \times \frac{15}{23} = 135x$$

$$\text{Second son} = (207x) \times \frac{5}{23} = 45x$$

$$\text{Third son} = (207x) \times \frac{3}{23} = 27x$$



Since first son got the least in actual distribution, therefore, as per question, first son got ₹1456 more in new distribution.

$$\Rightarrow 135x - 23x = 1456$$

$$\Rightarrow 112x = 1456$$

$$\Rightarrow x = \frac{1456}{112}$$

$$\Rightarrow x = 13$$

Hence, the sum was $207 \times 13 = ₹2691$

7. A man plays 100 games with the cards. He gets Rs. 5 if he wins and pays Rs. 2 if he loses. If he wins Rs. 3 on the whole in how many games did he win?

- A. 25
- B. 28
- C. 29
- D. 32

Ans: C

Sol:

Suppose he wins the first game and loses the second. Then his gain = $5 - 2 = \text{Rs. } 3$
Out of remaining 98 games, amount won = amount lost \Rightarrow Games won : Games lost = 2:5

\therefore in last 98 games, he wins $(2/7) \times 98 = 28$ games

\Rightarrow Total games he won = $28 + 1 = 29$

8. The marks of three students A, B and C are in the ratio 10:12:15. If the maximum marks of the paper are 90, then the maximum marks of B can be in the range:

- A. 70 – 80
- B. 80 – 90
- C. 20 – 30
- D. 40 – 50

Ans: A

Sol:

Let the marks obtained by A, B and C be $10x$, $12x$ and $15x$

Then, C's maximum marks = $15 \times 6 = 90$

Therefore, B's maximum marks = $12 \times 6 = 72$

Hence, option A is the correct answer.



9.4 years back, the age of Garvit was three times that of Yuvansh, but one year back the age of Garvit was two times that of Yuvansh, what is the age difference between their present ages?

- A. 7 years
- B. 13 years
- C. 11 years
- D. 6 years

Ans: D

Sol:

Let the present age of Garvit = x

And the present age of Yuvansh = y

4 years back, age of Garvit = $(x - 4)$

And, 4 years back, age of Yuvansh = $(y - 4)$

Now, according to question,

$$\Rightarrow (x - 4) = 3(y - 4)$$

$$\Rightarrow x - 4 = 3y - 12$$

$$\Rightarrow x - 3y = -8$$

$$\Rightarrow (x - 1) = 2(y - 1)$$

$$\Rightarrow x - 1 = 2y - 2$$

$$\Rightarrow x - 2y = -1$$

By subtracting eq2 in eq1

$$\Rightarrow x - 3y - (x - 2y) = -8 - (-1)$$

$$\Rightarrow y = 7$$

By putting value of y in eq1

$$\Rightarrow x - 3 \times 7 = -8$$

$$\Rightarrow x = 13$$

Therefore, Difference between age of Garvit and Yuvansh = $(13 - 7) = 6$ years

10.35 kg of watermelon has 44% water after some time water become 90%, then find new weight of watermelon.

- A. 114 kg
- B. 108 kg
- C. 196 kg
- D. 216 kg



Ans: C

Sol:

Let new weight of watermelon = x kg

$$\text{Quantity of remaining part in watermelon} = x \times \frac{(100-90)}{100} = \frac{x}{10}$$

$$\text{Quantity of water in 35 kg watermelon} = 35 \times 44\% = 35 \times \frac{44}{100} = 15.4 \text{ kg}$$

$$\text{Remaining part of watermelon} = (35 - 15.4) = 19.6 \text{ kg}$$

Now, according to question,

$$\frac{x}{10} = 19.6$$

$$\Rightarrow x = 196 \text{ kg}$$

Required, new weight of watermelon = 196 kg

11. A purse has Rs. 80 in the form of Rs. 2, Rs. 1, 50 Paise and 10 Paise coins in the ratio of 2:3:5:5, find the total number of coins.

- A. 105 coins
- B. 120 coins
- C. 135 coins
- D. 150 coins

Ans: B

Sol:

Let the number of Rs. 2, Rs. 1, 50 Paise and 10 Paise coins is 2x, 3x, 5x, and 5x respectively.

Now, according to question,

$$(2x) \times 2 + (3x) \times 1 + (5x) \times \frac{1}{2} + (5x) \times \frac{1}{10} = 80$$

$$4x + 3x + 2.5x + .5x = 80$$

$$10x = 80$$

$$x = 8$$

Therefore, total number of coins = $(2x + 3x + 5x + 5x) = 15x = 15 \times 8 = 120$ coins.

12. Find how many applicants had applied for a job if the ratio of selected to unselected applicants was 13:11. The ratio of selected to unselected applicants would have been 34:31, if 700 less had applied and 500 less selected.

- A. 6000
- B. 7200
- C. 6600
- D. 9600



Ans: B

Sol:

Let the selected candidates are $13x$ and the unselected candidates are $11x$.

Total number of candidates = $13x + 11x = 24x$

If 700 less had applied then total number of candidates = $24x - 700$

And if, 500 less selected then number of selected candidates = $13x - 500$

Now, number of unselected candidates = total number of candidates - selected number of candidates = $24x - 700 - (13x - 500)$

$$= 11x - 200$$

Now, according to question,

$$\frac{(13x - 500)}{(11x - 200)} = \frac{34}{31}$$

$$\Rightarrow 403x - 15500 = 374x - 6800$$

$$\Rightarrow 29x = 8700$$

$$\Rightarrow x = 300$$

Therefore, total number of candidates = $24x = 24 \times 300 = 7200$

13. When x is added to each of 10, 23, 15 and 33, the sums obtained in this order are in proportion. The value of $(x + 5)$ is:

- A. 8
- B. 5
- C. 1
- D. 3

Ans: A

Sol:

Given:

When x is added to each of 10, 23, 15 and 33, the sums obtained in this order are in proportion

As per question,

$$\frac{10 + x}{23 + x} = \frac{15 + x}{33 + x}$$

$$\Rightarrow 330 + 33x + 10x + x^2 = 345 + 23x + 15x + x^2$$

$$\Rightarrow 330 + 43x = 345 + 38x$$

$$\Rightarrow 43x - 38x = 345 - 330$$

$$\Rightarrow 5x = 15$$

$$\Rightarrow x = 15/5 = 3$$

Now, required $(x + 5)$

$$= 3 + 5 = 8$$



14. One-sixth of one-half of three-eighth of a number is 20. What will be 40% of that number?

- A. 256
- B. 300
- C. 286
- D. 275

Ans: A

Sol:

Given:

One-sixth of one-half of three-eighth of a number is 20

Let the number be x.

Then,

$$\frac{1}{6} \times \frac{1}{2} \times \frac{3}{8} \times (x) = 20$$

$$\tilde{\sim} 3x = 20 \times 96$$

$$\tilde{\sim} x = 1920/3 = 640$$

Now, 40% of the number = $640 \times 40\% = 256$

Hence, the correct answer is option A.

15. A certain sum is divided between A, B, C and D such that the ratio of the shares of A and B is 3 : 4, that of B and C is 5 : 6 and that of C and D is 9 : 10. If the difference between the shares of A and C is Rs.3,240, then what is the share of D?

- A. Rs.8,800
- B. Rs.8,640
- C. Rs.9,520
- D. Rs.9,600

Ans: D

Sol:

Calculation of ratio of A, B, C and D:

| | | | | | | | |
|----|---|----|---|----|---|----|-----|
| A | : | B | : | C | : | D | |
| 3 | : | 4 | : | 5 | : | 6 | ×15 |
| | | | | | | 9 | ×12 |
| | | | | | | 10 | ×8 |
| 45 | : | 60 | : | 72 | : | 80 | |

Hence, the ratio of A : B : C : D = 45 : 60 : 72 : 80

Now, share of D = $\frac{\text{Difference between the shares of A and C}}{\text{Difference between the ratio of A and C}} \times \text{Ratio of D}$

$$= \frac{3240}{72 - 45} \times 80 = \frac{3240}{27} \times 80 = \text{Rs. } 9600$$

Hence, the correct answer is option D.



16. Hridaya opened her piggy bank and found coins of denomination Rs. 1, Rs. 2, Rs. 5 and Rs. 10 in the ratio 10 : 5 : 2 : 1. If there are 72 coins in all, then how much money (in Rs) was there in the piggy bank in the form of coins?

- A. 160
- B. 72
- C. 90
- D. 100

Ans: A

Sol: Hridaya opened her piggy bank and found coins of denomination Rs. 1, Rs. 2, Rs. 5 and Rs. 10 in the ratio 10 : 5 : 2 : 1.

Number of Rs. 1 coins = $10x$

Number of Rs. 2 coins = $5x$

Number of Rs. 5 coins = $2x$

Number of Rs. 10 coins = x

Total number of coins = 72

According to question :

$$\Rightarrow 10x + 5x + 2x + x = 72$$

$$\Rightarrow 18x = 72$$

$$\Rightarrow x = 4$$

Hence, Money (in Rs) in the piggy bank in the form of coins =

$$40(1) + 20(2) + 8(5) + 4(10) = 40 + 40 + 40 + 40 = \text{Rs. } 160$$

17. Fourth proportion to 12, 18 and 6 is same as the third proportion to k and 6. What is value of k ?

- A. 13.5
- B. 3
- C. $\sqrt{6}$
- D. 4

Ans: D

Sol:

Fourth proportion to 12, 18 and 6 is same as the third proportion to k and 6.

Let fourth proportion to 12, 18 and 6 is x

$$\partial 12:18::6:x$$

$$\partial 12x = 18 \times 6$$

$$\partial x = 9$$

Hence, Fourth proportion to 12, 18 and 6 is 9.

Therefore, third proportion to k and 6 is also 9.



$$\delta k:6::6:9$$

$$\delta 9k = 6 \times 6$$

$$\delta 9k = 36$$

$$\delta k = 4$$

18. What is the difference in the mean proportional between 1.8 and 3.2 and the third proportional to 5 and 3?

- A. 0.5
- B. 0.4
- C. 0.7
- D. 0.6

Ans: D

Sol:

Mean proportional between 1.8 and 3.2 = $\sqrt{1.8 \times 3.2} = 2.4$

Third proportional to 5 and 3 = $3 \times \frac{3}{5} = 1.8$

Now, difference = $2.4 - 1.8 = 0.6$

Hence, the correct answer is option D.

19. Fourth proportion to 12, 18, 6 is equal to the third proportional to 4, k. What is the value of k?

- A. 6.5
- B. 4
- C. 6
- D. $4\sqrt{3}$

Ans: C

Sol:

Let fourth proportion to 12, 18, 6 is x

$$\rightarrow 12 : 18 :: 6 : x$$

$$\rightarrow 12x = 18 \times 6$$

$$\rightarrow x = 9$$

Fourth proportion to 12, 18, 6 is equal to the third proportional to 4, k.

$$\rightarrow 4 : k :: k : 9$$

$$\rightarrow k^2 = 36$$

$$\rightarrow k = 6$$



20. Monthly salaries of Anil and Kumud are in the ratio 19 : 17. If Anil and Kumud get salary hike of ₹2000 and ₹1000 respectively, then the ratio in their salaries becomes 8 : 7. What is the salary of Kumud before hike (in ₹)?

- A. 18000
- B. 35000
- C. 38000
- D. 34000

Ans: D

Sol:

Let the monthly salary of Anil and Kumud are $19x$ and $17x$ respectively
According to question,

$$\Rightarrow \frac{19x + 2000}{17x + 1000} = \frac{8}{7}$$

$$\Rightarrow 133x + 14000 = 136x + 8000$$

$$\Rightarrow 136x - 133x = 14000 - 8000$$

$$\Rightarrow 3x = 6000$$

$$\Rightarrow x = 2000$$

Therefore, salary of Kumud before hike = $17x = 17 \times 2000 = 34000$

Hence, option D is correct.

21. The income of A is $\frac{2}{3}$ of B's income and the expenditure of A is $\frac{3}{4}$ of B's

expenditure. If $\frac{1}{3}$ of the income of B is equal to the expenditure of A, then the ratio of the savings of A to those of B is:

- A. 5 : 3
- B. 3 : 5
- C. 4 : 3
- D. 3 : 4

Ans: B

Sol:

Let income of B = x then income of A = $\frac{2}{3}x$

And expenditure of B = y then expenditure of A = $\frac{3}{4}y$

According to question,

$$\frac{1}{3}x = \frac{3}{4}y$$



$$\Rightarrow x = \frac{9}{4}y$$

$$\text{Savings of A} = \frac{2}{3} \times \frac{9}{4}y - \frac{3}{4}y = \frac{3}{4}y$$

$$\text{Savings of B} = \frac{9}{4}y - y = \frac{5}{4}y$$

$$\text{Ratio of A to B} = \frac{3}{4}y : \frac{5}{4}y = 3 : 5$$

Hence, option B is the correct answer.

22. The ratio of the profits of P and Q is 5 : 8 . What is their investment ratio, if their investment time period ratio is 3 : 5?

- A. 13 : 25
- B. 12 : 25
- C. 24 : 25
- D. 25 : 24

Ans: D

Sol:

Let the investment ratio of P and Q be $x : y$.

We know that, Profit = Investment \times Time period

So, according to the question:

$$\frac{3x}{5y} = \frac{5}{8}$$

$$\Rightarrow \frac{x}{y} = \frac{25}{24}$$

23. The sum of three numbers is 98 . If the ratio of the first to the second is 2 : 3 and that of the second to the third is 5 : 8, then the third number is :

- A. 30
- B. 20
- C. 49
- D. 48

Ans: D

Sol:

Ratio of first and second number = $(2 : 3)_{\times 5} = 10 : 15$

Ratio of second and third number = $(5 : 8)_{\times 3} = 15 : 24$

Ratio of first, second and third number = 10 : 15 : 24

Let the first, second and third number be $10x, 15x$ and $24x$



ATQ,

$$10x + 15x + 24x = 98$$

$$\Rightarrow 49x = 98$$

$$x = 2$$

$$\text{Third number} = 24x = 48$$

24. A, B and C divide an amount of Rs. 10,500 amongst themselves in the ratio 5 : 7 : 9 respectively. If each one gets Rs. 500 more, then what will be the ratio of the amounts with A, B and C ?

A. 5 : 7 : 9

B. 3 : 4 : 5

C. 7 : 9 : 11

D. 5 : 6 : 7

Ans: B

Sol:

Ratio 5 : 7 : 9

$$\text{A get} = 10500 \times \frac{5}{5+7+9} = 2500$$

$$\text{B get} = 10500 \times \frac{7}{5+7+9} = 3500$$

$$\text{C get} = 10500 \times \frac{9}{5+7+9} = 4500$$

If each get Rs. 500 more,

$$\text{A : B : C} = 3000 : 4000 : 5000$$

$$= 3 : 4 : 5$$

Hence, the correct answer is option B.

25. The number of books on Mathematics, Physics and Chemistry in a University library is in the ratio 8 : 5 : 9. There is a proposal to increase these books by 10%, 5% and 5% respectively. What will be the ratio of the number of books after increment?

A. 37 : 47 : 83

B. 176 : 105 : 189

C. 212 : 117 : 47

D. 189 : 115 : 117

Ans: B

Sol:

The number of books on Mathematics, Physics and Chemistry in a University library is in the ratio 8 : 5 : 9.



Let the number of books of Mathematics, Physics and Chemistry be 800, 500 and 900.

After increment:

$$\begin{aligned}\text{Number of Mathematics books} &= 110/100 \times 800 \\ &= 880\end{aligned}$$

$$\begin{aligned}\text{Number of Physics books} &= 105/100 \times 500 \\ &= 525\end{aligned}$$

$$\begin{aligned}\text{Number of Chemistry books} &= 105/100 \times 900 \\ &= 945\end{aligned}$$

$$\therefore \text{New ratio} = 880 : 525 : 945$$

$$= 176 : 105 : 189$$

Hence, option B is the correct answer.

26. If $\frac{2}{3}$ of A = 75% of B = 60% of C, then A:B:C is equal to:

A. 9:8:10

B. 8:9:10

C. 3:4:5

D. 4 :3:5

Ans: A

Sol:

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

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

On dividing by 6 (LCM of 2,3 and 3)

$$\Rightarrow \frac{A}{9} = \frac{B}{8} = \frac{C}{10}$$

$$\therefore A : B : C = 9 : 8 : 10$$

27. Same quantity of rice is required for each member of a family of 15 members. On a particular day, due to the absence of some members of the family, the consumption of rice was reduced in the ratio 5 : 3. The number of members absent on that day was

A. 3

B. 6

C. 8

D. 9



Ans: B

Sol:

Total consumption : New consumption = 5 : 3

Total consumption = $15 * 5 = 75$

New consumption = $75 * \frac{3}{5} = 45$

Number of people = $45/5 = 9$

So, people absent = $15 - 9 = 6$

28. A normal cycle has 2 gears – one is attached to the pedal and the other is attached to the rear wheel. Radius of small gear is 6 cm and of the big gear is 14 cm. If 7 continuous teeth of big gear subtend an angle of 30° at the centre, then how many teeth are there in the small gear?

A. 27

B. 36

C. 30

D. 33

Ans: B

Sol:

Number of teeth in big gear = $(360^\circ/30^\circ) \times 7 = 12 \times 7 = 84$

Now we know that the radii of gears are directly proportional to the number of teeth in them.

Therefore, $6:14 = x:84$, where x is the number of teeth in the small gear.

$\Rightarrow 6/14 = x/84$

$\Rightarrow x = 6 \times 6 = 36$

29. A student gave exam of physics, chemistry and maths and got percentage marks in the ratio of 10:16:15. The total marks for each subject is different. In physics, the total marks are 50% more than of chemistry and 25% less than of maths. If he got 80 marks in chemistry out of total. Then find the sum of marks he got in maths and physics together.

A. 225

B. 215

C. 100

D. 115

Ans: A

Sol:

Let the total marks of chemistry be 'n'

Then total marks of physics = $n(1+50/100) = 3n/2$



And, total marks in maths $\times (1 - 25/100) = 3n/2$

\therefore Total marks in maths = $2n$

Let marks scored in physics be P and maths be M and chemistry is 80

Convert the all the percentage marks, we get,

$$\therefore \frac{P}{\frac{3n}{2}} \times 100 : \frac{80}{n} \times 100 : \frac{M}{2n} \times 100 = 10 : 16 : 15$$

$$\frac{2P}{3} : 80 : \frac{M}{2} = 10 : 16 : 15$$

$$\frac{2P}{3} : 80 : \frac{M}{2} = 50 : 80 : 75$$

Comparing the ratios,

$$\Rightarrow 2P/3 = 50$$

$$\Rightarrow P = 75$$

And,

$$\Rightarrow M/2 = 75$$

$$\Rightarrow M = 150$$

Sum of marks of physics and maths = $75 + 150 = 225$

30. A certain distance is covered by a cyclist at a certain speed. If a jogger covers half the distance in double the time, the ratio of the speed of the jogger to that of the cyclist is

- A. 1 : 4
- B. 4 : 1
- C. 1 : 2
- D. 2 : 1

Ans: A

Sol:

The distance covered by the cyclist, $s' = d/t$

And that by the jogger = $s'' = \frac{d}{2t}$

\therefore the ratio of the speed of the jogger to that of the cyclist $\frac{s'}{s''} = \frac{1}{4}$

31. Two friends invested their capital in the same bank. Amount received by A after 10 years is equal to the amount received by B after 13 years. If rate of compound interest is 20% per annum, then what is the respective ratio of capitals of A and B?

- A. 125:216
- B. 216:125
- C. 36:25
- D. 6:5



Ans: B**Sol:**

$$\text{Required ratio} = \left(\frac{120}{100}\right)^3 = 216 : 125$$

32. There are 1045 litre Petrol and 175 litre kerosene oil. The price of petrol is Rs70.25 per litre and price of kerosene is Rs90.10/litre. Equal amount of petrol and kerosene is taken out and then petrol is poured out in the vessel of kerosene and kerosene is poured out in the vessel of petrol, now rate of both the mixtures is same. What is the amount of oil taken out from each of the vessel?

- A. 62.76 ltr
- B. 65.62 ltr
- C. 75 ltr
- D. 80 ltr

Ans: B**Sol:**

In this type of questions individual price does not matter. To prove this solve it algebraically.

Ratio of quantity of petrol and kerosene

$$105 : 175 = 3 : 5$$

$$\text{Exchanged amount} = \frac{3 \times 175 + 5 \times 105}{2(3 + 5)}$$

$$= \frac{525 + 525}{16} = \frac{1050}{16} = \frac{525}{8}$$

$$= 65.62 \text{ ltr.}$$

33. If $a : b : c = 3 : 2 : 4$, then $\sqrt{3a^2 + \frac{5}{4}b^2 + 2c^2}$ is equal to:

- A. $4b$
- B. $2a$
- C. $2c$
- D. Both A and C

Ans: D

Sol:

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

$$\begin{aligned} & \sqrt{3a^2 + \frac{5}{4}b^2 + 2c^2} \\ &= \sqrt{3 \times 9x^2 + \frac{5}{4} \times 4x^2 + 2 \times 16x^2} \\ &= \sqrt{27x^2 + 5x^2 + 32x^2} = \sqrt{64x^2} = 8x \\ &= 8 \times \frac{c}{4} = 2c \text{ or } 8 \times \frac{b}{2} = 4b \end{aligned}$$

34. If $2A = 3B = 7C = 42$, then what is the value of $A \times B \div C$?

- A. 49
- B. 34
- C. 21
- D. 56

Ans: A**Sol:**

Given, $2A = 3B = 7C = 42$

Thus, $A = 21, B = 14, C = 6$

Hence, $A \times B \div C = 21 \times 14 \div 6 = 49$

35. If $\frac{x}{y} = \frac{6}{5}$, find the value of $\frac{x^2 + y^2}{x^2 - y^2}$.

- A. $\frac{51}{12}$
- B. $\frac{61}{11}$
- C. $\frac{45}{6}$
- D. $\frac{23}{12}$

Ans: B**Sol:**

$$\frac{x^2 + y^2}{x^2 - y^2} = \frac{\frac{x^2}{y^2} + 1}{\frac{x^2}{y^2} - 1} = \frac{\left(\frac{x}{y}\right)^2 + 1}{\left(\frac{x}{y}\right)^2 - 1} = \frac{\left(\frac{6}{5}\right)^2 + 1}{\left(\frac{6}{5}\right)^2 - 1} = \frac{61}{25} \times \frac{25}{11} = \frac{61}{11}$$



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36. One year ago the ratio of Ram's and Shyam's salaries was 3 : 5. The ratio of their individual salaries of last year and the present year are 2 : 3 and 4 : 5, respectively. If their total salaries for the present year is Rs 8600, find the present salary of Ram.

- A. Rs 3600
- B. Rs 4800
- C. Rs 4500
- D. Rs 3750

Ans: A

Sol:

Ratio of ram's salary for last and present year = 2 : 3

Ratio of Shyam's salary for last and present year = 4 : 5

Ratio of their salaries during last year = 3 : 5

Now, we change the first two ratios

$$2 : 3 = \frac{2 \times 3}{2} : \frac{3 \times 3}{2} = 3 : \frac{9}{2}$$

And

$$4 : 5 = \frac{4 \times 5}{4} : \frac{5 \times 5}{4} = 5 : \frac{25}{4}$$

Now, the ratio of salary of the present year will be

$$\frac{9}{2} : \frac{25}{4} = 18 : 25$$

$$\text{The present salary of ram} = \frac{18}{18+25} \times 8600 = \text{Rs } 3600$$

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

- A. 1:3
- B. 3:4
- C. 3:2
- D. 2:3

Ans: D

Sol:

$$\text{We have } \frac{A}{B} = \frac{3}{4}$$

$$\text{And } \frac{B}{C} = \frac{8}{9}$$

$$\frac{A}{C} = \left(\frac{A}{B} \times \frac{B}{C} \right)$$

$$\left(\frac{3}{4} \times \frac{8}{9} \right) = \frac{2}{3}$$

$$\text{So } A : C = 2 : 3$$



38. The ratio of income of A, B and C is 3:7:4. A's expenditure is 12.5% more than B's and C's expenditure is 25% more than B. If A saves Rs. 6000 and C saves Rs. 10000, then find the difference between income of B and C.

- A. Rs. 20000
- B. Rs. 12000
- C. Rs. 5000
- D. Rs. 15000

Ans: D

Sol:

Let the income of A, B and C be $3x$, $7x$ and $4x$ respectively.

The ratio of their expenditure

A : B : C

9 : 8

8 : 10

9 : 8 : 10

Therefore their expenditure are $9y$, $8y$ and $10y$ respectively.

Now, according to the question

$$3x - 9y = 6000$$

$$4x - 10y = 10000$$

On solving the above equation, we get

$$6x = 30000$$

$$x = 5000$$

Therefore, difference in income of B and C = $7x - 4x = 3x = \text{Rs. } 15000$

39. Adi and Manu continued a business for 36 months. Adi contributed Rs.300 for certain time and Manu invested a Rs.500 for some time. If out of total profit of Rs.1020, Adi gets Rs.495, then for how long Adi kept his money?

- A. 16 months
- B. 18 months
- C. 20 months
- D. 22 months

Ans: D

Sol:

Total time = 36 months

Let Adi time of contribution = t_a

Manu time = t_m



$$300 \times t_a = 500 \times t_m = \text{ratio of their profits}$$

Total profit = Rs.1020

Adi's share = Rs.495

Manu's share = 1020 - 495 = Rs. 525

Ratio of profits = 495 : 525 = 33 : 35

Now we can compare the ratio of profits :

$$\frac{300 \times t_a}{500 \times t_m} = \frac{33}{35}$$

$$\frac{t_a}{t_m} = \frac{33 \times 500}{35 \times 300} = \frac{11}{7}$$

So, the time period for which Adi invested :

$$= \frac{11}{18} \times 36 = 22 \text{ months}$$

40. The marks of 3 students A, B and C in the ratio 12 : 15 : 18 . If the maximum marks of the papers are 100 then the marks of B can not be in the range of:(if marks of all students in integer)

- A. 20 - 30
- B. 40 - 50
- C. 80 - 90
- D. 60 - 70

Ans: C

Sol:

Let the marks of A, B and C are 12x, 15x and 18x.

Nearest multiple of 18 which is less 100 is 90.

Let x = 5

Thus, maximum marks of A can be = 12x

$$= 12 \times 5 = 60$$

Maximum marks of B can be = 15x

$$= 15 \times 5 = 75$$

Maximum marks of C can be = 18x

$$= 18 \times 5 = 90$$

As the marks are fixed and they cannot exceed the maximum marks.

So, the marks of B cannot be in the range of (80 - 90) i.e. B cannot score above 80.



41. If the present age of Q is 33.33% more than the present age of P and the present age of R is 35% more than the present age of Q. If the average of the present age of P, Q and R is $62/3$ years. After X years, the ratio of the age of P and R is 9: 13. Find the value of X?

- A. 18
- B. 10
- C. 15
- D. 12

Ans: D

Sol:

As we know,

$$33.33\% = 1/3$$

Let the present age of P is $3k$, then the present age of Q will be $4k$.

The present age of R will be $4k + 7/20$ of $4k = 4k + 7k/5 = 27k/5$

According to the question,

$$\frac{3k + 4k + \frac{27k}{5}}{3} = \frac{62}{3}$$

$$\Rightarrow 35k + 27k = 62 \times 5$$

$$\Rightarrow 62k = 62 \times 5$$

$$\Rightarrow k = 5$$

The present age of P is $3k = 15$ years

The present age of R is $27k/5 = 27$ years

According to the question,

$$(15+x)/(27+x) = 9/13$$

$$\Rightarrow 195 + 13x = 243 + 9x$$

$$\Rightarrow 4x = 48$$

$$\Rightarrow x = 12.$$

42. In a class of 217 students. Number of boys is 33.33% more than girls. If nine girls are admitted to the class and five boys are rusticated from the class. Find the ratio of the number of boys to that of the girls.

- A. 7:6
- B. 6:7
- C. 3:2
- D. 2:3

Ans: A



Sol:

Total number of students = 217

Boys is 33.33 % more than girls

Ratio of boys: girls = 4: 3

Number of boys = $\frac{4}{7} \times 217 = 124$

Number of girls = $\frac{3}{7} \times 217 = 93$

Now, new number of boys = $124 - 5 = 119$

New number of girls = $93 + 9 = 102$

New ratio of boys: girls = $119: 102 = 7: 6$

43. Two candles of the same length are lighted at 12 noon. The first is consumed in 3 hours and the second in 2 hours. Assuming that each candle burns at a constant rate, at what time after being lighted, was the first candle twice the length of the second?

- A. 1:30 pm
- B. 1 pm
- C. 12:45 pm
- D. 1:15 pm

Ans: A**Sol:**

Let the height of the both candles be LCM (3, 2) = 6 units.

As first candle is consumed in 3 hours, so

$\frac{6}{3} = 2$ units are consumed in 1 hour.

Similarly,

Second candle is consumed in 2 hours, so

$\frac{6}{2} = 3$ units are consumed in 1 hour.

According to question, 't' hours after being lightened, the ratio between the candles become 2 : 1.

So,

$$\Rightarrow (6 - 2t)/(6 - 3t) = 2/1$$

$$\Rightarrow t = 1.5 \text{ hours or } 90 \text{ minutes}$$

Since the candles were lighted at 12 noon. The first candle will be twice the length of first candle at 1:30 PM.

44. A normal cycle has 2 gears – one is attached to the pedal and the other is attached to the rear wheel. Radius of small gear is 6 cm and of the big gear is 14 cm. If 7 continuous teeth of big gear subtend an angle of 30° at the centre, then how many teeth are there in the small gear?



Sol:

Number of teeth in big gear = $(360^\circ/30^\circ) \times 7 = 12 \times 7 = 84$

Now we know that the radii of gears are directly proportional to the number of teeth in them.

Therefore, $6:14 = x:84$, where x is the number of teeth in the small gear.

$$\Rightarrow 6/14 = x/84$$

$$\Rightarrow x = 6 \times 6 = 36$$

45. A teacher distributes 150 sweets in the class. Total sweets distributed among girls is equal to $2/3^{\text{rd}}$ of that distributed among boys. Boys steal some sweets from the girls due to which the ratio of sweets with girls to boys becomes 3:7 and each boy then gets 3 sweets and each girl gets 1 sweet each. Then find, how many total students are there.

Sol:

Let the total no. of students be N .

Given that, total sweets = 150

If no. of girls are ' x ' and no. of boys are ' y '

No. of sweets girls get = $2/3$ of (No. of sweets boys get)

\therefore No. of sweets girls get : No. of sweets boys get = 2 : 3

$$\Rightarrow \text{No. of sweets girls get} = 2 * 150/5 = 60$$

$$\Rightarrow \text{No. of sweets boys get} = 3 * 150/5 = 90$$

Now, When boys steal the sweets the ratio = 3:7

$$\Rightarrow \text{No. of sweets girls get} = 3 * 150 / 10 = 45$$

$$\Rightarrow \text{No. of sweets boys get} = 7 * 150 / 10 = 105$$

Given that,

Each boy now gets = 3 sweets

$$\therefore \text{No. of boys} = 105/3 = 35$$

Each girl now gets = 1 sweet

$$\therefore \text{No. of girls} = 45/1 = 45$$

Thus, Total No. of students in the class = No. of boys + No. of girls

$$= 35 + 45$$

$$= 80 \text{ students}$$

46. The smallest integer, which when subtracted from the terms in ratio 7 : 8, gives ratio less than 13 : 17 .

- A. 3
- B. 4
- C. 2
- D. 5



Ans: B

Sol:

Let that smallest integer be x .

Then, as per question,

$$\frac{7-x}{8-x} < \frac{13}{17}$$

$$119 - 17x < 104 - 13x$$

$$119 - 104 < 17x - 13x$$

$$15 < 4x$$

$$3.75 < x$$

Smallest integer, greater than 3.75, is 4.

47. When ticket price of a water park is decreased in the ratio 11:9, then the number of daily visitors to the park increased in the ratio 5:7. If the daily revenue before the decrease in ticket price was Rs. 13200, then find the daily revenues after decrease in ticket price.

- A. 15120 Rs.
- B. 14400 Rs.
- C. 16800 Rs.
- D. 15600 Rs.

Ans: A

Sol:

Given:

Total revenue = 13200

Let the ticket price of a water park before decrease in ticket price = $11x$ and number of daily visitors = $5y$

And, the ticket price of a water park after decrease in ticket price = $9x$ and number of daily visitors = $7y$

Now, according to question,

We know that:

Total revenue = price of a ticket \times total number of units

Total revenue before the decrease in ticket price = $(11x) \times 5y$

$$\Rightarrow 13200 = 55xy$$

$$\Rightarrow xy = 240$$

Required, total revenue after the decrease in ticket price = $(9x) \times 7y = 63xy = 63 \times 240 = 15120$ Rs.



48. A sum of Rs 6342 is divided amongst A, B, C and D in the ratio 3 : 4 : 8 : 6. What is the difference between the shares of B and D?

- A. Rs 906
- B. Rs 302
- C. Rs 604
- D. Rs 1510

Ans: C

Sol:

Given:

Total sum = 6342

Required, difference between the shares of B and D =

$$\frac{6342}{(3 + 4 + 8 + 6)} \times (6 - 4) = \frac{6342}{21} \times 2 = 604 \text{ Rs.}$$

Hence, option C is correct.

49. The ratio of two numbers A and B is 5 : 8 . If 5 is added to each of A and B, then the ratio becomes 2 : 3 . The difference in A and B is.

- A. 10
- B. 12
- C. 20
- D. 15

Ans: D

Sol:

Let the two numbers A and B are 5x and 8x respectively

Now, according to question,

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

$$\Rightarrow 15x + 15 = 16x + 10$$

$$\Rightarrow 15 - 10 = 16x - 15x$$

$$\Rightarrow x = 5$$

Therefore, required difference of A and B = 8x - 5x = 3x = 3 × 5 = 15

Hence, option D is correct.



50. The ratio of monthly incomes of A and B is 4 : 5 and that of their monthly expenditures is 3 : 8 . If the income of A is equal to the expenditure of B, then what is the ratio of savings of A and B?

- A. 5 : 2
- B. 8 : 3
- C. 3 : 8
- D. 2 : 5

Ans: A

Sol:

The ratio of monthly incomes of A and B is 4 : 5 and that of their monthly expenditures is 3 : 8.

| | A | B |
|-------------|---|---|
| Income | 4 | 5 |
| Expenditure | 3 | 8 |

Income of A is equal to the expenditure of B.

| | A | B |
|-------------------------------|------------------|-------------------|
| Income | $4 \times 2 = 8$ | $5 \times 2 = 10$ |
| Expenditure | 3 | 8 |
| Saving = Income - Expenditure | 5 | 2 |

Ratio of savings of A and B = 5 : 2

51. Two numbers are in the ratio 2 : 3. If 5 is subtracted from the first number and six is added to the second number, then the ratio becomes 5:12. What would the ratio become when eight is added to each number?

- A. 14 : 11
- B. 14 : 19
- C. 11 : 14
- D. 19 : 14

Ans: B

Sol:

Two numbers are in the ratio 2 : 3.

Let first number = 2x

Second number = 3x

If 5 is subtracted from the first number and six is added to the second number, then the ratio becomes 5:12.

$$\Rightarrow \frac{2x - 5}{3x + 6} = \frac{5}{12}$$

$$\Rightarrow 24x - 60 = 15x + 30$$



$$\Rightarrow 9x = 90$$

$$\Rightarrow x = 10$$

Hence, first number = 20

Second number = 30

Now, ratio when eight is added to each number = $(20+8) : (30+8) = 28 : 38 = 14 : 19$

52. If P is the third proportional to 3, 9, then what is the fourth proportional to 6, P, 4?

A. $\frac{3}{2}$

B. 18

C. 10

D. $2\sqrt{3}$

Ans: B

Sol:

We know that:

If three numbers are A, B, and C, then fourth proportional = $\frac{B \times C}{A}$

If two numbers are A, B, then third proportional = $\frac{B \times B}{A}$

Third proportional P = $\frac{9 \times 9}{3} = 27$

Fourth proportional of 6, 27, 4 = $\frac{27 \times 4}{6} = \frac{108}{6} = 18$

Hence, option B is correct

53. When x is subtracted from each of the numbers 54, 49, 22 and 21, the numbers so obtained are in proportion. The ratio of $(8x - 25)$ to $(7x - 26)$ is:

A. 27 : 26

B. 29 : 24

C. 15 : 13

D. 5 : 4

Ans: B

Sol:

If x is subtracted from each of number 54, 49, 22 and 21 the numbers, so obtained are in proportion.



$\Rightarrow (54-x), (49-x), (22-x)$ and $(21-x)$ are in proportion.

$$\Rightarrow (54-x)(21-x) = (49-x)(22-x)$$

$$\Rightarrow 1134 - 54x - 21x + x^2 = 1078 - 49x - 22x + x^2$$

$$\Rightarrow -75x + 1134 = -71x + 1078$$

$$\Rightarrow 4x = 56$$

$$\Rightarrow x = 14$$

$$\text{Hence, ratio of } (8x - 25) \text{ to } (7x - 26) = \frac{8x - 25}{7x - 26} = \frac{8(14) - 25}{7(14) - 26} = \frac{87}{72} = \frac{29}{24}$$

54. If a, b and c are positive numbers such that

$$(a^2 + b^2) : (b^2 + c^2) : (c^2 + a^2) = 34 : 61 : 45$$

Then $(b - a) : (c - b) : (c - a) = \underline{\hspace{2cm}}$.

A. $3 : 2 : 1$

B. $2 : 1 : 3$

C. $3 : 1 : 2$

D. $1 : 2 : 3$

Ans: B

Sol:

Given:

$$(a^2 + b^2) : (b^2 + c^2) : (c^2 + a^2) = 34 : 61 : 45$$

$$\text{Sum of ratios} = 34 + 61 + 45 = 140$$

$$\text{Let } (a^2 + b^2) = 34x \dots(i)$$

$$\text{Then, } (b^2 + c^2) = (34x) \times \frac{61}{34} = 61x \dots(ii)$$

$$\text{And } (c^2 + a^2) = (34x) \times \frac{45}{34} = 45x \dots(iii)$$

By adding all three equations,

$$a^2 + b^2 + b^2 + c^2 + c^2 + a^2 = 34x + 61x + 45x$$

$$\Rightarrow 2(a^2 + b^2 + c^2) = 140x$$

$$\Rightarrow a^2 + b^2 + c^2 = 140x/2$$

$$\Rightarrow a^2 + b^2 + c^2 = 70x \dots(iv)$$

By Eq. (iv) - Eq. (i),

$$\Rightarrow c^2 = 70x - 34x$$

$$\Rightarrow c^2 = 36x$$

$$\Rightarrow c = \sqrt{36x} = 6\sqrt{x}$$

By Eq. (iv) - Eq. (ii),

$$\Rightarrow a^2 = 70x - 61x$$

$$\Rightarrow a^2 = 9x$$



$$\Rightarrow a = \sqrt{9x} = 3\sqrt{x}$$

By Eq. (iv) – Eq. (iii),

$$\Rightarrow b^2 = 70x - 45x$$

$$\Rightarrow b^2 = 25x$$

$$\Rightarrow b = \sqrt{25x} = 5\sqrt{x}$$

Now, required

$$b - a : c - b : c - a$$

$$(5\sqrt{x} - 3\sqrt{x}) : (6\sqrt{x} - 5\sqrt{x}) : (6\sqrt{x} - 3\sqrt{x})$$

$$2\sqrt{x} : \sqrt{x} : 3\sqrt{x}$$

$$2 : 1 : 3$$

Hence, option B is the correct answer.

55. One cup has juice and water in the ratio 5 : 2, while another cup of the same capacity has them in the ratio 7 : 4, respectively. If contents of both the cups (when full) are poured in a vessel, then what will be the final ratio of water to juice in the vessel?

- A. 52 : 25
- B. 25 : 52
- C. 26 : 25
- D. 25 : 26

Ans: B

Sol:

Let the capacity of the cups be $77x$ litres.

$$\text{Then, juice in first cup} = (77x) \times \frac{5}{5+2} = (77x) \times \frac{5}{7} = 55x \text{ litres}$$

$$\text{Water in first cup} = 77x - 55x = 22x \text{ litres}$$

$$\text{Now, juice in second cup} = (77x) \times \frac{7}{7+4} = (77x) \times \frac{7}{11} = 49x \text{ litres}$$

$$\text{Water in second cup} = 77x - 49x = 28x \text{ litres}$$

$$\text{Quantity of juice in vessel} = 55x + 49x = 104x \text{ litres}$$

$$\text{And quantity of water in vessel} = 22x + 28x = 50x \text{ litres}$$

$$\text{Ratio of water to juice in vessel} = 50x : 104x$$

$$25 : 52$$

Hence, option B is the correct answer.



56. A sum of 46,800 is divided among A, B, C and D in such a way that the ratio of the combined share of A and D to the combined share of B and C is 8 : 5. The ratio of the share of B to that of C is 5 : 4. A receives 18,400. If x is the difference between the shares of A and B and y is the difference between the shares of C and D, then what is the value of $(x - y)$ (in ₹)?

- A. 7000
- B. 6000
- C. 6500
- D. 5000

Ans: B

Sol:

$$\text{Amount received by A \& D combined} = \frac{8}{13} \times 46800 = 28800$$

$$\text{Amount received by D} = 28800 - 18400 = 10400$$

$$\text{Amount received by B \& C combined} = 46800 - 28800 = 18000$$

$$\text{Amount received by B} = \frac{5}{9} \times 18000 = 10000$$

$$\text{Amount received by C} = \frac{4}{9} \times 18000 = 8000$$

$$X = 18400 - 10000 = 8400$$

$$Y = 10400 - 8000 = 2400$$

$$X - Y = 8400 - 2400 = 6000$$

Hence, option B is the correct answer

