RATIO AND PROPORTION PROBLEMS WITH SOLUTIONS

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Ratio and Proportion

Some facts of Ratio and proportion:

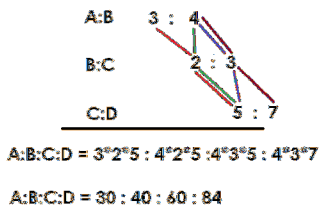
- Ratio is written as 2 : 3, where 2 and 3 are known as terms.
- First term i.e. 2 is known as Antecedent.
- Second term i.e. 3 is known as Consequent.
- 2^2: 3^2 is known as duplicate ratio of 2 : 3.
- 2^3: 3^3 is known as triplicate ratio of 2 : 3.
- $\sqrt{2}$: $\sqrt{3}$ is sub-duplicate ratio of 2 : 3.
- $2^{1/3}$: $3^{1/3}$ is sub-triplicate ratio of 2 : 3.

Ratio and Proportion Trick

One example which can be solved in 30 sec if you use this trick

Example: If A : B = 3 : 4, B : C = 2 : 3 and C : D = 5 : 7, then find A : B : C : D.

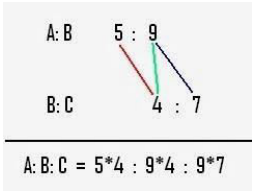
Solution: General method of solving this question is very lengthy, so let me tell you how can we calculate it easily.



See how it is simple, you just need to remember the pattern and if you notice it, it is really simple

Last and first steps are just the straight lines. So, what is left, just the middle pattern?

If we talk about only three terms i.e. A, B and C. Then the pattern will be much easier. Let's see how,



Let us do an example of 5 terms:

Example 1: If A: B = 3: 4, B: C = 4: 5, C: D = 1: 2 and D: E = 3: 4, Find A: B: C: D: E.

Solution: Similarly, in this case, make the same pattern as in above cases:

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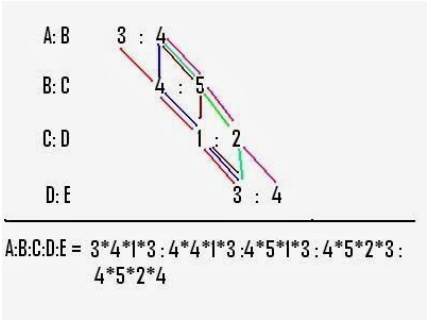
Take a pen and try to make it yourself first or do it step by step by looking at the solution, then only you can learn this technique.



A: B: C: D: E = 9: 12: 15: 30: 40

Example 2: Divide Rs.672 in the ratio 5 : 3

Solution: Sum of ratio terms = (5 + 3) = 8

First part = Rs. $\left[672 \times \frac{5}{8}\right]$ = Rs.420, Second part = Rs. $\left[672 \times \frac{3}{8}\right]$ = Rs.252

Example 3: Divide Rs.1162 amng A, B C in the ratio 35 : 28 : 20

Solution: Sum of ratio terms = 35 + 28 + 20 = 83

A's share = Rs. $\left[1162 \times \frac{35}{83}\right]$ = Rs.490

B's share = Rs. $\left[1162 \times \frac{28}{83}\right]$ = Rs.392

C's share = Rs. $\left[1162 \times \frac{20}{83}\right]$ = Rs.280

Exercise

1) A bag contains 50 p, 25 p and 10 p coins in the ratio 5 : 9 : 4, amounting to Rs.206. Find the number of coins of each type respectively.
   a) 200, 305, 106 b) 210, 350, 148 c) 200, 360, 160
   d) 200, 160, 180 e) None of these

2) The ratio of length to width of a rectangular sheet of paper is 5 : 3. If the width of the sheet is 18 cm, find its length?
   a) 10 cm b) 20 cm c) 25 cm
   d) 30 cm e) None of these

3) The ratio between the number of men and women in an office is 5 : 7. If the number of women working in the office is 56. Find the number of men working in the office

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a) 40 b) 50 c) 45
d) 60 e) None of these

4) If (a + b) : (a - b) = 15 : 1, then the value of $a^2 - b^2$ is :
a) 56 b) 15 c) 112
d) 8 e) None of these

5) The students in three classes are in the ratio of 2 : 3 : 4. If 40 students are added in each class, the ratio becomes 4 : 5 : 6. Find the total number of students in all the three classes is :
a) 270 b) 180 c) 126
d) 135 e) None of these

6) Two equal containers are filled with the mixture of milk and water. The concentration of milk in each of the container is 20% and 25% respectively. What is the ratio of water in both the containers respectively?
a) 15 : 16 b) 16 : 15 c) 4 : 5
d) 5 : 4 e) None of these

7) A camel pursue an elephant and takes 5 leaps for every 7 leaps of the elephant, but 5 leaps of elephant are equal to 3 leaps of camel. What is the ratio of speeds of camel and elephant?
a) 21 : 25 b) 24 : 23 c) 25 : 21
d) 23 : 24 e) None of these

8) The age of Sachin is 4 times that of his son. Five years ago Sachin was nine times as old as his son was at that time. The present age of the Sachin is :
a) 25 years b) 36 years c) 32 years
d) 48 years e) None of these

9) Bhanu and Shafeeq started a business by investing Rs.36,000 and Rs.63,000. Find the share of each respectively, out of an annual profit of Rs.5500.
a) 2000, 5500 b) 2500, 4500 c) 3000, 4000
d) 2000, 3500 e) None of these

10) If A : B = 3 : 4 and B : C = 8 : 9, then A : C is :
a) 1 : 3 b) 3 : 2 c) 2 : 3
d) 1 : 2 e) None of these

11) If A : B = $\frac{1}{2} : \frac{3}{8}$, B : C = $1\frac{1}{3} : 5\frac{5}{9}$ and C : D = $\frac{5}{6} : \frac{3}{4}$, then the ratio A : B : C : D is:
a) 4 : 6 : 8 : 10 b) 6 : 4 : 8 : 10 c) 6 : 8 : 9 : 10
d) 8 : 6 : 10 : 9 e) None of these

12) If $\frac{A}{3} = \frac{B}{4} = \frac{C}{5}$, then A : B : C is :
a) 4 : 3 : 5 b) 5 : 4 : 3 c) 3 : 4 : 5
d) 20 : 15 :2 e) None of these

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13) If $\frac{1}{5} : \frac{1}{x} = \frac{1}{x} : \frac{1}{1.25}$, then the value of x is :
a) 1.5 b) 2 c) 2.5
d) 3.5 e) None of these

14) If $5x^2$ - 13xy + $6y^2$ = 0, then x : y is :
a) 2 : 1 only b) 3 : 5 only c) 5 : 3 or 1 : 2
d) 3 : 5 or 2 : 1 e) None of these

15) A child has three different kinds of chocolates costing Rs.2, Rs.5 and Rs.10. He spends total Rs.120 on the chocolates. What is the minimum possible number of chocolates, he can buy, if there must be atleast one chocolate of each kind?
a) 22 b) 19 c) 17
d) 15 e) None of these

16) Rs.4536 is divided among 4 men, 5 women and 2 boys. The ratio of share of a man, a woman and a boy is 7 : 4 : 3. What is the share of a woman?
a) Rs.336 b) Rs.498 c) Rs.166
d) Rs.256 e) None of these

17) The ratio of income of Anil and Mukesh is 2 : 3. The sum of their expenditure is Rs.8000 and the amount of savings of Anil is equal to the amount of expenditure of Mukesh. What is the sum of their savings?
a) 22,000 b) 4,000 c) 16,000
d) 12,000 e) None of these

18) The salaries of A, B, C are in the ratio 2 : 3 : 5. If the increments of 15%, 10% and 20% are allowed respectively in their salaries, then what will be the new ratio of their salaries?
a) 3 : 3 : 10 b) 10 : 11 : 20 c) 23 : 33 : 60
d) Cannot be determined e) None of these

19) The sum of three numbers is 98. If the ratio of the first to the second is 2 : 3 and that of the second to the third is 5 : 8, then the second number is :
a) 20 b) 30 c) 48
d) 58 e) None of these

20) If 40% of a number is equal to two-third of another number, what is the ratio of first number to the second number?
a) 2 : 5 b) 3 : 7 c) 5 : 3
d) 7 : 3 e) None of these

21) An amount of Rs.735 was divided between A, B and C. If each of them had received Rs.25 less, their shares would have been in the ratio of 1 : 3 : 2. The money received by C was :
a) Rs.195 b) Rs.200 c) Rs.225
d) Rs.245 e) None of these

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22) The speeds of three cars are in the ratio 5 : 4 : 6. The ratio between the time taken by them to travel the same distance is :
a) 5 : 4 : 6 b) 6 : 4 : 5 c) 10 : 12 : 15
d) 12 : 15 : 10 e) None of these

23) The compounded ratio of (2 : 3), (6 : 11) and (11 : 2) is :
a) 1 : 2 b) 2 : 1 c) 11 : 24
d) 36 : 121 e) None of these

24) If 4A = 5B and 3A = 2C, the ratio of B : C is :
a) 4 : 3 b) 5 : 8 c) 8 : 15
d) 10 : 15 e) None of these

25) What number must be subtracted from each of the numbers 53, 21, 41, 17 so that the remainders are in proportion?
a) 1 b) 3 c) 5
d) Data inadequate e) None of these

26) Two numbers are in the ratio 3 : 5. If 9 is subtracted from each, the new numbers are in the ratio 12 : 23. The smaller number is :
a) 27 b) 33 c) 49
d) 55 e) None of these

27) Rs.366 are divided amongst A, B and C so that A may get $\frac{1}{2}$ as much as B and C together, B may get $\frac{2}{3}$ as much as A and C together, then the share of A is :
a) Rs.122 b) Rs.129.60 c) Rs.146.60
d) Rs.183 e) None of these

28) Ratio of the earnings of A and B is 4 : 7. If the earnings of A increase by 50% and those of B decrease by 25%, the new ratio of their earnings becomes 8 : 7. What are A's earnings?
a) Rs.21,000 b) Rs.26,000 c) Rs.28,000
d) Data inadequate e) None of these

29) The average age of three boys is 25 years and their ages are in the proportion 3 : 5 : 7. The age of the youngest boy is :
a) 21 years b) 18 years c) 15 years
d) 9 years e) None of these

30) The ratio of the incomes of A and B is 5 : 4 and the ratio of their expenditure3s is 3 : 2. If at the end of the year, each saves Rs.1600, then the income of A is :
a) Rs.3400 b) Rs.3600 c) Rs.4000
d) Rs.4400 e) None of these

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31) In the squadron of Indian Air Force the ratio of Sukhoi is to Mig and Jaguar together is 5 : 7 and the ratio of Jaguar is to Sukhoi and Mig together is 1 : 2. Find the ratio of Sukhoi and Mig :
a) 2 : 7 b) 3 : 5 c) 3 : 1
d) 5 : 3 e) None of these

32) Divide Rs.6940 in such a way that A gets $\frac{2}{3}$rd of what B gets and B gets $\frac{3}{5}$th of what C gets? What is the share of A and B together?
a) Rs.1982 b) 1388 c) 3470
d) Data inadequate e) None of these

33) 6 pumps of kirlosker can fill a tank in 7 days and 2 similar pumps of USHA can fill the same tank in 18 days. What is the ratio of the efficiency of a Kirlosker pump and a USHA pump?
a) 6 : 7 b) 7 : 6 c) 7 : 54
d) Cannot be determined e) None of these

34) The ratio of three numbers is 3 : 4 : 7 and their product is 18144. The numbers are :
a) 9, 12, 21 b) 15, 20, 25 c) 18, 24, 42
d) Data inadequate e) None of these

35) If a carton containing a dozen mirrors is dropped, which of the following cannot be the ratio of broken mirrors to unbroken mirrors?
a) 2 : 1 b) 3 : 1 c) 3 : 2
d) 7 : 5 e) None of these

36) The third proportional to 0.36 and 0.48 is :
a) 0.64 b) 0.1728 c) 0.42
d) 0.94 e) None of these

37) Gold is 19 times as heavy as water and copper is 9 times as heavy as water. In what ratio should these be mixed to get an alloy 15 times as heavy as water?
a) 1 : 1 b) 2 : 3 c) 1 : 2
d) 3 : 2 e) None of these

38) In a school, 10% of the boys are same in number as $\frac{1}{4}$th of the girls. What is the ratio of boys to girls in that school?
a) 3 : 2 b) 5 : 2 c) 2 : 1
d) 4 : 3 e) None of these

39) A and B are two alloys of gold and copper prepared by mixing metals in the ratio 7 : 2 and 7 : 11 respectively. If equal quantities of the alloys are melted to form a third alloy C, the ratio of gold and copper inn C will be :
a) 5 : 7 b) 5 : 9 c) 7 : 5
d) 9 : 5 e) None of these

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40) The ages of Vinay, Varsha, Veera and Vikram are in arithmetic progression, but not in order. The ratio of ages of Vinay and Varsha is 6 : 5 and Veera is to Vikram is 7 : 8. Two years later the age of Varsha and Vikram will be 2 : 3. Find the ratio of ages of Vinay and Veera :

a) 7 : 6 b) 5 : 8 c) 6 : 7
d) 8 : 9 e) None of these

41) A couple got married 9 years ago when the age of wife was 20% less than her husband. 6 years from now the age of wife will be only 12.5% less than her husband. Now they have six children including single, twins and triplets and the ratio of their ages is 2 : 3 : 4 respectively. What can be the maximum possible value for the present age of this family?

a) 110 years b) 103 years c) 105 years
d) 83 years e) None of these

42) Salaries of Ravi and Sumit are in the ratio 2 : 3. If the salary of each is increased by Rs.4000, the new ratio becomes 40 : 57. What is Sumit's present salary?

a) Rs.17,000 b) Rs.20,000 c) Rs.25,500
d) Data inadequate e) None of these

43) Seats for Mathematics, Physics and Biology in a school are in the ratio 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 75% respectively, what will be the ratio of increased seats?

a) 2 : 3 : 4 b) 6 : 7 : 8 c) 6 : 8 : 9
d) Data inadequate e) None of these

44) The third proportional to $(x^2 - y^2)$ and (x - y) is :

a) (x + y) b) (x - y) c) $\frac{x+y}{x-y}$
d) $\frac{x-y}{x+y}$ e) None of these

45) Which of the following ratios is greatest?

a) 7 : 15 b) 15 : 23 c) 17 : 25
d) 21 : 29 e) None of these

46) In three vessels, each of 25 litres capacity, mixture of milk and water is filled. The ratio of milk and water are 3 : 1, 2 : 3, 4 : 3 in the respective vessels. If all the three vessels are emptied into asingle large vessel, then what will be the ratio of water to milk in the resultant mixture?

a) 179 : 241 b) 197 : 214 c) 219 : 117
d) 179 : 234 e) None of these

47) A vessel of capacity 2 litre has 25% alcohol and another vessel of capacity 6 litre had 40 alcohol. The total liquid of 8 litre was poured out in a vessel of capacity 10 litre and thus the rest part of the vessel was filled with the water. What is the new concentration of mixture?

a) 31% b) 71% c) 49%

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d) 29% e) None of these

48) If Rs.782 be divided into three parts, proportional to $\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$, then the first part is :
a) Rs.182 b) Rs.190 c) Rs.196
d) Rs.204 e) None of these

49) A sum of money is to be distributed among A, B, C, D in the proportion of 5 : 2 : 4 : 3. If C gets Rs.1000 more than D, what is B's share?
a) Rs.500 b) Rs.1500 c) 2000
d) Data inadequate e) None of these

Solutions:

1. Option C

Let the number of 50 p, 25 p and 10 p coins be 5x, 9x and 4x respectively.
Then, $\frac{5x}{2} + \frac{9x}{4} + \frac{4x}{10} = 206$
50x + 45x + 8x = 4120 103x = 4120 x = 40
Number of 50 p coins = (5 × 40) = 200; number of 25 p coins = (9 × 40) = 360; number of 10 p coins = (4 × 40) = 160

2. Option D

Let the length of sheet of paper be x cm. Then the ratio of length to width = x : 18
Thus, x : 18 = 5 : 3
x × 3 = 18 × 5
x = 30
Hence the length of paper = 30 cm

3. Option A

5 : 7 = x : 56 (suppose number of men = x)
x = 40 (by the first property)
Therefore, number of men in the office = 40

4. Option B

$\frac{(a+b)}{(a-b)} = \frac{15}{1}$
$\frac{a}{b} = \frac{8}{7}$ (by componendo and dividend)
Therefore $a^2 - b^2 = 64 - 49 = 15$

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5. Option B

$2x + 40 = 4y$ … (i)
$3x + 40 = 5y$ …. (ii)
$4x + 40 = 6y$ ….. (iii)
Therefore $2x = 40$
$x = 20$
Hence, total number of students = $2x + 3x + 4x = 9x$
$= 9 \times 20 = 180$

6. Option B

Milk	20%	25%
Water	80%	75%

Therefore, required ratio $= \frac{80}{75} = \frac{16}{15}$ or 16 : 15

7. Option C

Ratio of speed of camel and elephant $= \frac{5}{3} : \frac{7}{5} = \frac{5}{3} \times 15 : \frac{7}{5} \times 15$
$= 25 : 21$

8. Option C

Let the age of son is x years, then the age of Sachin will be 4x years.
So, $(4x - 5) = 9 (x - 5)$ $x = 8$
So, age of Sachin is 32 years.

9. Option D

Ratio of shares of Bhanu and Shafeeq = 36000 : 63000 = 4 : 7
So, Share of Bhanu $= 5500 \times \frac{4}{11} =$ Rs.2000
And share of Shafeeq $= 5500 \times \frac{7}{11} =$ Rs.3500

10. Option C

$\left[\frac{A}{B} = \frac{3}{4}, \frac{B}{C} = \frac{8}{9}\right]$ $\frac{A}{C} = \left[\frac{A}{B} \times \frac{B}{C}\right] = \left[\frac{3}{4} \times \frac{8}{9}\right] = \frac{2}{3}$ A : C = 2 : 3

11. Option D

A : B $= \frac{1}{2} : \frac{3}{8} = 4 : 3$, B : C $= \frac{1}{3} : \frac{5}{9} = 3 : 5$, C : D $= \frac{5}{6} : \frac{3}{4} = 10 : 9$
A : B = 4 : 3, B : C = 3 : 5 and C : D = 5 : $\frac{9}{2}$
A : B : C : D = 4 : 3 : 5 : $\frac{9}{2}$ = 8 : 6 : 10 : 9

12. Option C

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Let $\frac{A}{3} = \frac{B}{4} = \frac{C}{5} = k$ Then, A = 3k, B = 4k and C = 5k

A : B : C = 3k : 4k : 5k = 3 : 4 : 5

13. Option C

$\frac{1}{5} : \frac{1}{x} = \frac{1}{x} : \frac{100}{125}$ $\left[\frac{1}{x} \times \frac{1}{x}\right] = \left[\frac{1}{5} \times \frac{100}{125}\right] = \frac{4}{25}$

$\frac{1}{x^2} = \frac{4}{25}$ $x^2 = \frac{25}{4}$ $x = \frac{5}{2} = 2.5$

14. Option B

$5x^2 - 13xy + 6y^2 = 0$ $5x^2 - 10xy - 3xy + 6y^2 = 0$

$5x(x - 2y) - 3y(x - 2y) = 0$

$(x - 2y)(5x - 3y) = 0$

$x = 2y$ pr $5x = 3y$ $\frac{x}{y} = \frac{2}{1}$ or $\frac{x}{y} = \frac{3}{5}$

So, (x : y) = (2b : 1) or (3 : 5)

15. Option C

Minimum number of chocolates are possible when he purchases maximum number of costliest chocolates.

Thus, $2 \times 5 + 5 \times 2 = Rs.20$

Now, Rs.100 must be spend on 10 chocolates as $100 = 10 \times 10$

Thus, minimum number of chocolates = 5 + 2 + 10 = 17

16. Option A

Share of a man, a woman and a boy = 7x, 4x and 3x

Then the share of 4 men $= 4 \times 7x$ 28x

Then the share of 5 women $= 5 \times 4x = 20x$

Then the share of 2 boys $= 2 \times 3x = 6x$

Now, the share of all women = $\frac{20x}{(28x + 20x + 6x)} \times 4536$

$= \frac{20}{54} \times 4536 = Rs.1680$

Hence, the share of one woman = $\frac{1680}{5} = 336$

17. Option D

Let the incomes of A and M is 2x and 3x

Let the savings of A be K, then the expenditure of M be K

Also expenditure of A = 2x - K

Given (2x - K) + K = 8000

x = 4000

So, total income of A and B = 2x + 3x = 5x = 5 × 4000 = 20000

So, total savings of A and B = 20,000 - 8000 = Rs.12,000

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18. Option C

Let A = 2k, B = 3k and C = 5k

A's new salary $= \frac{115}{100}$ of $2k = \left[\frac{115}{100} \times 2k\right] = \frac{23}{10k}$

B's new salary $= \frac{110}{100}$ of $3k = \left[\frac{110}{100} \times 3k\right] = \frac{33}{10k}$

C's new salary $= \frac{120}{100}$ of $5k = \left[\frac{120}{100} \times 5k\right] = 6k$

So, new ratio $= \frac{23k}{10} : \frac{33k}{10} : 6k = 23 : 33 : 60$

19. Option B

Let the three parts be A, B, C Then,

A : B 2 : 3 and B : C = 5 : 8 $= \left[5 \times \frac{3}{5}\right] : \left[8 \times \frac{3}{5}\right] = 3 : \frac{24}{5}$

A : B : C = 2 : 3 : $\frac{24}{5}$ = 10 : 15 : 24

B $= \left[98 \times \frac{15}{49}\right] = 30$

20. Option C

Let 40% of A $= \frac{2}{3}$B. Then, $\frac{40A}{100} = \frac{2B}{3}$

$\frac{2A}{5} = \frac{2B}{3}$

$\frac{A}{B} = \left[\frac{2}{3} \times \frac{5}{2}\right] = \frac{5}{3}$

So, A : B = 5 : 3

21. Option C

Remainder $= \text{Rs.}\left[735 - (25 \times 3)\right] = \text{Rs.}660$

So money received by C $= \text{Rs.}\left[(660 \times \frac{2}{6}) + 25\right] = \text{Rs.}225$

22. Option D

Ratio of time taken $= \frac{1}{5} : \frac{1}{4} : \frac{1}{6} = 12 : 15 : 10$

23. Option B

Required ratio $= \left[\frac{2}{3} \times \frac{6}{11} \times \frac{11}{2}\right] = \frac{2}{1} = 2 : 1$

24. Option C

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A : B = 5 : 4 10 : 8
A : C = 2 : 3 10 : 15
So, A : B : C = 10 : 8 : 15
So, B : C = 8 : 15

25. Option C

$\frac{(53 - x)}{(21 - x)} = \frac{(41 - x)}{(17 - x)}$
x = 5

26. Option B

Let the numbers be 3x and 5x. Then, $\frac{3x - 9}{5x - 9} = \frac{12}{23}$
23 (3x - 9) = 12 (5x - 9)
9x = 99
x = 11
So, the smaller number = (3 × 11) = 33

27. Option A

A : (B + C) = 1 : 2
A's share = Rs.$\left[366 \times \frac{1}{3}\right]$ = Rs.122

28. Option D

Let the original earnings of A and B be Rs.4x and Rs.7x.
New earnings of A = 150% of Rs.4x = Rs.$\left[\frac{150}{100} \times 4x\right]$ = Rs. 6x
New earnings of B = 75% of Rs. 7x = Rs. $\left[\frac{75}{100} \times 7x\right]$ = Rs. $\frac{21x}{4}$
So, $6x : \frac{21x}{4} = 8 : 7$
$\frac{6x \times 4}{21x} = \frac{8}{7}$
This does not give x. So, the given data is inadequate.

29. Option C

Total age of 3 boys = 25 × 3 = 75 year. Ratio of their ages = 3 : 5 : 7
Age of the youngest = $\left[75 \times \frac{3}{15}\right]$ years = 15 years

30. Option C

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Let the incomes of A and B be Rs.5x and Rs.4x respectively and let their expenditures be Rs. 3y and Rs.2y respectively.
The, 5x - 3y = 1600 … (i) and 4x - 2y = 1600 .. (ii)
On multiplying (i) by 2, (ii) by 3 and subtracting, we get 2x = 1600
x = 800
So, A's income = Rs.5x = Rs.(5 × 800) = Rs.4000

31. Option D

S : (M + J) = 5 : 7 7S = 5M + 5J ….. (i)
J : (S + M) = 1 : 2 2J = S + M …. (ii)
By solving equations (i) and (ii) we get
S : M : J = 5 : 3 : 4
So, S : M = 5 : 3

32. Option C

A : B = 2 : 3 and B : C = 3 : 5
A : B : C = 2 : 3 : 5
So, (A + B) : C = 5 : 5 = 1 : 1
Hence, share of (A + B) = $\frac{1}{2} \times 6940 = 3470$

33. Option A

The number of days required by a single Kirlosker pump to fill the tank = 6 × 7 = 42 days and the number of days required by a single USHA pump to fill the same tanks = 2 × 18 = 36 days. Now, since efficiency is inversely proportional to the number of days. Hence,
$\frac{Efficiency\ of\ one\ K-pump}{Efficiency\ of\ U-pump} = \frac{36}{42} = \frac{6}{7}$

34. Option C

Let the numbers be 3x, 4x and 7x. Then,
3x × 4x × 7x = 18144
$x^3 = 216$
$x^3 = 6^3$ x = 6
So, the numbers are 18, 24 and 42

35. Option C

For dividing 12 into two whole numbers, the sum of the ratio terms must be a factor of 12. So, they cannot be in the ratio 3 : 2

36. Option A

Let the third proportional to 0.36 and 0.48 be x.

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Then, 0.36 : 0.48 : : 0.48 : x

$x = \left[\frac{0.48 \times 0.48}{0.36}\right] = 0.64$

37. Option D

G = 19W and C = 9W
Let 1 gm of gold be mixed with x gm of copper to get (1 + x) gm of the alloy.
(1 gm gold) + (x gm copper) = (x + 1) gm of alloy
19W + 9Wx = (x + 1) × 15W
19 + 9x = 15 (x + 1)
6x = 4
$x = \frac{2}{3}$
So, ratio of gold with copper = $1 : \frac{2}{3} = 3 : 2$

38. Option B

10% of B = $\frac{1}{4}$G
$\frac{10B}{100} = \frac{1}{4}$G
B = $\frac{5}{2}$G
So, $\frac{B}{G} = \frac{5}{2}$
B : G = 5 : 2

39. Option E

Gold in C = $\left[\frac{7}{9} + \frac{7}{18}\right]$ units = $\frac{7}{6}$ units. Copper in C = $\left[\frac{2}{9} + \frac{11}{18}\right]$ units = $\frac{5}{6}$ units

40. Option C

Varsha : Vinay = 5 : 6 = 5x : 6x
Veera : Vikram = 7 : 8 = 7y : 8y
But their ages are in A.P.
Therefore, 6x - 5x = 8y - 7y
x = y
Again, $\frac{5x + 2}{8y + 2} = \frac{2}{3}$
$\frac{5x + 2}{8x + 2} = \frac{2}{3}$
x = 2
Therefore, the ages of Varsha, Vinay, Veera and Vikram are 10, 12, 14 and 16 years respectively.
Therefore, the ratio of ages of Vinay and Veera = 6 : 7

41. Option B

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$\frac{H-9}{W-9} = \frac{5}{4}$ and $\frac{H+6}{W+6} = \frac{8}{7}$

Thus the present age of husband is 34 and present age of his wife is 29 years.

Now, the maximum age of any child must be less than 9 years.

Hence their ages can be 2, 3 and 4 years or 4, 6 and 8 years. So the max, possible sum of age of this family

= 34 + 29 + (1 × 4 + 2 × 6 + 3 × 8)

= 103 years

42. Option E

Let the original salaries of Ravi and Sumit be Rs.2x and Rs.3x respectively. Then,

$\frac{2x+4000}{3x+4000} = \frac{40}{57}$

57 (2x + 4000) = 40 (3x + 4000)

6x = 68000

3x = 34000

Sumit's present salary = (3x + 4000) = Rs.(34000 + 4000) = Rs.38,000

43. Option A

Originally, let the number of seats for Mathematics, Physics and Biology be 5x, 7x and 8x respectively.

Number of increased seats are (140% of 5x), (150% of 7x) and (175% of 8x)

i.e. $\left[\frac{140}{100} \times 5x\right]$, $\left[\frac{150}{100} \times 7x\right]$ and $\left[\frac{175}{100} \times 8x\right]$ i.e. 7x, $\frac{21x}{2}$ and 14x.

So, required ratio = $7x : \frac{21x}{2} : 14x = 14x : 21x : 28x = 2 : 3 : 4$

44. Option D

Let the third proportional to $(x^2 - y^2)$ and (x - y) be z. Then,

$(x^2 - y^2) : (x - y) :: (x - y) : z$

$(x^2 - y^2) \times z = (x - y)^2$

$z = \frac{(x-y)^2}{(x^2-y^2)} = \frac{(x-y)}{(x+y)}$

45. Option D

$\frac{7}{15} = 0.466, \frac{15}{23} = 0.652, \frac{17}{25} = 0.68$ and $\frac{21}{29} = 0.724$

Clearly, 0.724 is greatest and therefore, 21 : 29 is greatest.

46. Option A

The ratio of milk in 3 vessels $= \frac{3}{4} \times \frac{5 \times 7}{5 \times 7} : \frac{2}{5} \times \frac{4 \times 7}{4 \times 7} : \frac{4}{7} \times \frac{4 \times 5}{4 \times 5}$

$= \frac{105}{140} : \frac{56}{140} : \frac{80}{140}$

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Remember, The value of 25 litre does not matter, the basic thing is that the amount of mixture in all the three quantities is same.
So, the total quantity of milk in mixture = 105 + 56 + 80 = 241

$= \left[(3 \times 140) - 241\right] = 179$ litre
Therefore, ratio of water to milk in the new mixture = 179 : 241

47. Option D

Amount of alcohol in first vessel = $0.25 \times 2 = 0.5$ litre
Amount of alcohol in second vessel = $0.4 \times 6 = 2.4$ litre
Total amount of alcohol out of 10 litres of mixture is 0.5 + 2.4 = 2.9 litre

Hence, the concentration of the mixture is $29\%\left[= \frac{2.9}{10} \times 100\right]$

48. Option D

Given ratio $= \frac{1}{2} : \frac{2}{3} : \frac{3}{4} = 6 : 8 : 9$

$\left[\quad\right]$

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So, 1st part = Rs. $782 \times \frac{6}{23}$ = Rs.204

49. Option C

Let the shares of A, B, C and D be Rs.5x, Rs.2x, Rs.4x and Rs.3x respectively.
Then, $4x - 3x = 1000$ $x = 1000$
So, B's share = Rs.2x = Rs.(2×1000) = Rs.2000

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