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Top Ratio and Proportion Questions for Bank SSC Railway LIC Exams

How to Easily Solve Ratio and Proportion Problems

If you take more than 5 seconds to solve Ratio and Proportion Problems, then this post is for you because this smart method does not even use the Ratio and Proportion Formulas!

**HOW TO EASILY SOLVE
RATIO AND PROPORTION
PROBLEMS**



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Amongst all the problems that are asked in the quantitative aptitude section of IBPS PO Exam, Ratio and Proportion Problems are the easiest. But the long list of Ratio and Proportion Formulas and the copious amount of calculations needed, often makes them tedious.

In the 20th Smart Method in this series of blog posts we will discuss a trick that will help you solve ratio and proportion problems without using the long list of ratio and proportion formulas, that too in only 5 seconds!



Ratio and Proportion

Ratio is a relationship between two numbers indicating how many times the first number contains the second. Proportion is a name we give to a statement where two ratios are equated with each other.

Ratio and Proportion Formulas

1. Ratio: The ratio of two quantities a and b in the same units, is the fraction a/b and we write it as $a : b$.



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In the ratio $a : b$, we call a as the first term or antecedent and b , the second term or consequent.

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

2. Proportion: The equality of two ratios is called proportion.

$a : b$
 a (first term) = antecedent
 b (second term) = consequent

If $a : b = c : d$, we write $a : b :: c : d$ and we say that a, b, c, d are in proportion.

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

Product of means = Product of extremes.

Thus, $a : b :: c : d \Leftrightarrow (b \times c) = (a \times d)$

Product of means = Product of extremes.
 $a : b :: c : d \Leftrightarrow (b \times c) = (a \times d)$



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Example of Ratio and Proportion Problems

A sum of money is divided among A, B, C and D ratio 3:5:8:9 respectively. If the share of D is 1872 more than the share of A, then what is the total amount of money of B & C together?

- 1) 4156 2) 4165 3) 4056 4) 4065 5) None of these

Conventional Method to Solve Ratio and Proportion Problems

The school book approach to this question uses the ratio and proportion formulas and starts with assuming T (or any other variable) as the total and then dividing it based on the relative division of the quantity between the quantities.

Let the total amount be 'T'

Step 1:

A's share = $(3/25)T$, B's share = $(5/25)T$, C's share = $(8/25)T$, D's share = $(9/25)T$

Step 2:

$$D = A + 1872$$

Step 3:

$$(9/25)T = (3/25)T + 1872$$



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Step 4:

$$(6/25)T = 1872$$

Step 5:

$$T = 1872 \times (25/6) = 7800$$

Step 6:

$$B + C = (5/25)T + (8/25)T$$

Step 7:

$$B + C = (13/25) \times 7800$$

Step 8:

$$B + C = 4056$$

Phew! Finally the correct answer after so many steps...



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Smart Method to Solve Ratio and Proportion Problems

The above method may lead you to the correct answer but it's a bad idea to use it in exams where time is not your friend! A smart method is one which *eliminates all extra calculations and steps*.

We know that

A's share = 3 parts, B's share = 5 parts, C's share = 8 parts, D's share = 9 parts

Step 1:

Also we know $D - A = 1872 = 9 \text{ parts} - 3 \text{ parts} = 6 \text{ parts} = 1872$

Step 2:

$B + C = 13 \text{ parts}$

Step 3:

On Cross Multiplication we get $B + C = 13 \times (1872/6) = 4056$

Rather than first get the value of whole, establish a relationship between the given ratios and eliminate all redundant steps and calculations.



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Establish a Relationship
Between the given Ratios and
NOT with the Whole

This will Eliminate all Extra
Steps and Calculations

Watch our expert faculty explain this smart method.



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Ratio and Proportion Questions

1). Chintu, Pintu and Mintu are three friends. Chintu is twice as old as Pintu and Mintu is as old as Chintu and Pintu together. Two years later, the ratio of age of Chintu and Mintu would be 7:10 what was the age of Pintu five years ago?

- a) 2 years
- b) 4 years
- c) 5 years
- d) 1 years
- e) 8 years

2). Find the ratio of speed of A, B and C if for every 11 steps taken by A, B takes 12 steps and C takes 14 steps. Also 12 steps of A are equal to 14 steps of B and 16 steps of C.

- a) 154:144:147
- b) 132:168:224
- c) 25:24:23
- d) None of these
- e) 161:123:113

3). The price of a ring varies jointly, with the cube root of number of diamonds and weight of gold used in it. The price of the ring was ₹10,000. When it had 64 diamonds and 15 gm. of gold. Find the no. of diamonds if the price of ring was ₹10,500 and weight of gold was 21 gm.



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- a) 3
- b) 9
- c) 27
- d) 81
- e) 16

4). There are two containers A and B. Container A is filled with 30 liters of kerosene while container B is filled with 30 liters of water. Ten liters of kerosene is taken from container A and put in container B and then twelve liters of the mixture (of kerosene and water) is taken from container B and put in container A. Find the ratio of kerosene in A and B respectively.

- a) 23:9
- b) 21:5
- c) 23:7
- d) 1:3
- e) None of these

5). In a school, students of class I and class II are going for a picnic to Surajkund and Badkal lake respectively. The ratio of number of students in class I and II is 5:3. Also the ratio of the contribution made by each student of class I and II is 19:17. If the total contribution made by all the students of both the class is Rs.29200, then find the total contribution made by class II students only.

- a) Rs.10950
- b) Rs.13789
- c) Rs.10200
- d) Rs.13272
- e) None of these



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6). A donkey moves at a speed of 8 kmph, when no load is put on him. Reduction in the speed of donkey varies directly to the square root of the kgs of load put on him. When only 4 kgs of load is put the speed of the donkey becomes 6 kmph. Find the minimum load that can be put on the donkey with which it cannot move.

- a) 64 kg
- b) 63.9 kg
- c) 65.2 kg
- d) Cannot be determined
- e) None of these

7). A container has a mixture of kerosene and castor oil in the ratio of 7:5 and another container contains kerosene and castor oil in the ratio of 5:3. Find the proportion in which the mixtures from two containers should be mixed so that the resultant mixture has ratio of kerosene and castor oil of 3:2.

- a) 2:3
- b) 3:2
- c) 4:1
- d) 5:2
- e) None of these

8). The no. of pens in three different pencil boxes in the ratio of 1:2:3. Find the ratio in which the number of pens in the first and the second boxes must be increased so that the new ratio becomes 3:2:1.

- a) 1:3
- b) 2:1
- c) 2:3
- d) 3:4
- e) None of these



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9). There are three vessels 1, 2 and 3. The ratio of the total capacity of vessels 1, 2 and 3 is 5:4:3 respectively. All the vessels are full of mixture of sugar syrup and water. In vessel 1, ratio of sugar syrup to water is 2:3. Similar ratio in case of vessel 2 and vessel 3 is 5:4 and 1:3 respectively. The mixture of all the three vessels is emptied into one bigger vessel. What is the resulting ratio of sugar syrup and water?

- a) 17:25
- b) 179:253
- c) 253:179
- d) 233:169
- e) None of these

Answer:

1) d), 2) a), 3) c), 4) c), 5) c), 6) a), 7) b), 8) b), 9) b).

Solutions:

1). Let Pintu's present age = x , Chintu = $2x$ and Mintu = $x + 2x = 3x$

Two years later $[2x + 2 / 3x + 2] = (7/10)$

$$20x + 20 = 21x + 14 \Rightarrow 6 = x$$

Pintu's present age = 6

Five years ago, his age was $6 - 5 = 1$ year

Answer: d)

2. Ratio of speed is same as ratio of distance covered by them as speed and distance are directly proportional to each other. When time is constant.

$$\begin{array}{ccc} A & B & C \\ (x/12) \times 11 & (x/14) \times 12 & (x/16) \times 14 \end{array}$$

Ratio is $(11/12) : (12/14) : (14/16)$

L.C.M of 12, 14, 16 is 336

$$= 308 : 288 : 294 = 154 : 144 : 147$$



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[What is x? Since distance covered by A in 12 steps is equal to distance covered by B in 14 steps and distance covered by C in 16 steps, hence let this distance =x. Distance covered in 1 step by A, B and C= (x/12), (x/14) and (x/16) respectively]

Answer: a)

3. Let price =P, number of diamonds = n and weight of gold = g

When p=10000, n=64 and g=15, k=?

$$P = kg_3\sqrt{n} \Rightarrow 10000 = k(15)(\sqrt[3]{64})$$

$$K = (10000/15 \times 4) = (500/3)$$

$$P = 10500, g = 21, k = (500/3), n = ?$$

$$P = (500/3) g_3\sqrt{n} \Rightarrow 10500 = (500/3) \cdot 21 \sqrt[3]{n}$$

$$\sqrt[3]{n} = 10500 \times (3/500) \times (1/21) = 3 \Rightarrow n = 27$$

Answer: c)

4. Container A

Kerosene water

30 0

-10 -+10 -

20 0

Container B

Kerosene water

0 30

10 30

When 10 litres of kerosene is taken out from A and put in B, then kerosene in A= 20 litres. Mixture in B= 40 litres in which ratio of Kerosene to water =10:30 = 1:3, when 12 litres of mixture is taken out from B, and put in A, then out of 12 litres

$12 \times (1/4) = 3$ litres is kerosene and remaining 9 litres is water.

Container A

Kerosene water

20 0

+3 +9-3 -9

23 9

Container B

Kerosene water

10 30

-7 21

Ratio of Kerosene in A to B = 23:7



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Answer: c)

5. Let the no. of students in class I be $5x$ and $3x$ respectively and contribution made by each student of class I and class II be $19y$ and $17y$ respectively.

Hence, ratio of total contribution of class I and class II = $5x \times 19y : 3x \times 17y = 95:51$

Total contribution made by students of class II $(51/(95+51)) \times 29200 = 10200$

Answer: c)

6. Speed of the donkey, Without any load = 8 kmph. With 4 kgs of load, speed becomes 6 kmph, hence speed is reduced by 2 kmph.

Reduction in speed varies directly with the square root of the load.

Hence $(8-6) = k\sqrt{4} = k \pm 1$

The donkey cannot move at zero speed. i.e. when his speed reduced by 8 kmph. So reduction in speed = 8 kmph

$8 = 1\sqrt{l} \Rightarrow \sqrt{l} = 8$ and $l = 64$, when $\sqrt{l} = -8$, $l = 64$

At 64 kg the donkey will stop.

Answer: a)

7.(2) Let quantity of mixture taken from first be x and second be y .

Amount of kerosene oil in the resultant mixture $(x+y)$ is

$$(7/12)x + (5/8)y = (3/5)(x+y)$$

$$(7/12)x - (3/5)x = (3/5)y - (5/8)y - (1/60)x = -(1/40)y \Rightarrow (x/y) = (6/4) = (3/2) = 3:2$$

Answer: b)

8. Let the no. of pens in 1st, 2nd and 3rd pencil box be x , $2x$ and $3x$ respectively and let the required no. be $3y$, $2y$ and y .

The quantity of pens in the third pencil box would remain the same, hence

$$3x = y \text{ or } x = (y/3)$$

Quantity of pens in the boxes originally is x , $2x$ and $3x$

When $x = (y/3)$, hence quantity is $x = (y/3)$, $2x = (2y/3)$, $3x = y$



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i.e $(y/3)$, $(2y/3)$, y

The required number of pens is $3y$, $2y$ and y in

Increase in 1st box = $3y - (y/3) = (8/3)y$ &

Increase in 2nd box = $2y - (2y/3) = (4/3)y$

Ratio of increase = $(8y/3) : (4/3)y = 2:1$

Answer: b)

9.Method-1: Let the total mixture in vessel 1, 2 and 3 be 5 litres and 3 litres respectively. So, quantity of water in $(5+4+3)=12$ litres of mixture is

$= (3/5) \times 5 + (4/9) \times 4 + (3/4) \times 3$

$= 3 + (16/9) + (9/4) = [(108+64+81)/36] = (253/36)$

Quantity of sugar syrup is

$12 - (253/36) = (179/36)$

Ratio of sugar syrup to water = $179:253$

Answer: b)

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

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

- a) 28 years
- b) 16 years



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- c) 26 years
- d) 44 years
- e) None of these

13). The ratio between Gloria's and Sara's present ages is 4:7 respectively, Two years ago the ratio between their ages was 1:2 respectively. What will be Sara's age three years hence?

- a) 17 years
- b) 14 years
- c) 11 years
- d) 8 years
- e) None of these

14). The total number of students in a school is 31700. If the ratio of boys to the girls in the school is 743:842 respectively, what is the total number of girls in the school?

- a) 14860
- b) 16480
- c) 15340
- d) Cannot be determined
- e) None of these

15). The ratio of the ages of A and B seven years ago was 3:4 respectively. The ratio of their ages nine years from now will be 7:8 respectively. What is B's age at present?

- a) 16 years
- b) 19 years
- c) 28 years
- d) 23 years
- e) None of these



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16). The ratio of the ages of A and B is 4:3 respectively. The ratio of their ages eight years from now will be 6:5 respectively. How old was A, when B was 7 years old?

- a) 16 years
- b) 11 years
- c) 9 years
- d) 12 years
- e) None of these

Direction (07 to 09): Study the following information and answer the questions that follow:

A sum of Rs. 10,980 is to be divided amongst A, B and C in the ratio 7:3:5 respectively.

17). How much is C's share?

- a) Rs. 3,600
- b) Rs. 3,006
- c) Rs. 3,650
- d) Rs. 3,660
- e) Rs. 3,124

18). What is the sum of B's and C's share?

- a) Rs. 5,685
- b) Rs. 5,865
- c) Rs. 5,897
- d) Rs. 5,873
- e) Rs. 5,856



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19).What is the difference between A's and B's shares?

- a) Rs. 2,196
- b) Rs. 2,928
- c) Rs. 2,961
- d) Rs. 2,289
- e) Rs. 2,982

20).The respective ratio between the present ages of father, mother and daughter is 7:6:2. The difference between mother's and the daughter's age is 24 years. What is the father's age at present?

- a) 43 years
- b) 42 years
- c) 39 years
- d) 38 years
- e) None of these

Answers:

1).a) 2).a) 3).a) 4).e) 5).d) 6).b) 7).d) 8).e) 9).b) 10).b)

Solution:

11).If the total amount be Rs. x , then $(2x / 15) = 4908$

$$x = (4908 \times 15) / 2 = \text{Rs. } 36810$$

$$\text{Required difference} = [(7 - 6) / 15] \times 36810 = \text{Rs. } 2454$$

Answer : a)

12).Four years ago,

Father's age = $10x$ years , son's age = $3x$ years

$$10x + 3x + 8 = 60 \text{ (sum of their ages} = 2 \times 30 = 60)$$

$$= 13x = 60 - 8 = 52 \Rightarrow x = 4$$



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Required difference

Answer : a)

13).Let Gloria's and Sara's present ages be $4x$ and $7x$ years respectively

Two years ago, $(4x - 2) / (7x - 2) = 1 / 2$

$$8x - 4 = 7x - 2 \Rightarrow x = 2$$

Sara's age three years hence = $7x + 3 = 17$ years

Answer : a)

14).Boys : Girls = 743 : 842

Total number of students = 31700

$$\text{Number of girls} = [842 / (743 + 842)] \times 31700 = (842 / 1585) \times 31700 \\ = 16840$$

Answer : e)

15).A's present age = $(3x + 7)$ years

B's present age = $(4x + 7)$ years, After 9 years,

$$(3x + 7 + 9) / (4x + 7 + 9) = 7 / 8$$

$$(3x + 16) / (4x + 16) = 7 / 8 \Rightarrow (3x + 16) / (x + 4) = 7 / 2$$

$$7x + 28 = 6x + 32 \Rightarrow x = 32 - 28$$

$$x = 4, \text{ B's present age} = 4x + 7 = 23 \text{ years}$$

Answer : d)

16).A's present age = $4x$ years, B's present age = $3x$ years

After 8 years,

$$(4x + 8) / (3x + 8) = 6 / 5 \Rightarrow 20x + 40 = 18x + 48$$

$$2x = 48 - 40 = 8$$

$$x = 4, \text{ B's present age} = 12 \text{ years}$$

$$\text{A's age} = 4x - 5 = 16 - 5 = 11$$

Answer : b)



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17). C's share = $(5 / 15) \times 10980 = \text{Rs. } 3660$

Answer : d)

18). (B + C)'s share = $[(3+5) / 15] \times 10980$

= $(8 / 15) \times 10980 = \text{Rs. } 5856$

Answer : e)

19). Required difference = $\text{Rs. } [(7-3) / 15] \times 10980 = \text{Rs. } 2928$

Answer : b)

20). According to the question,

$$6x - 2x = 24 \Rightarrow 4x = 24$$

$$X = 6$$

Father's present age = $7x = 7 \times 6 = 42$ years

Answer : b)

21). In a class of 60 students, where the girls are twice that of boys. Kamal ranked seventeenth from the top. If there are 9 girls ahead of Kamal, the number of boys in rank after him is:

- a) 3
- b) 7
- c) 12
- d) 13
- e) None of these

22). Two varieties of rice at Rs. 10 per kg and Rs. 12 per kg are mixed together in the ratio 1 : 2. What is the price of the resulting mixture?

- a) Rs. 10.50 per kg
- b) Rs. 10.67 per kg



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- c) Rs. 11.20 per kg
- d) Rs. 11.33 per kg
- e) None of these

23). If A varies directly proportional to C, and B also varies directly proportional to C, which one of the following is not correct?

- a) $(A + B) \propto C$
- b) $(A - B) \propto (1/C)$
- c) $\sqrt{AB} \propto C$
- d) $(A / B) = \text{constant}$
- e) None of these

24). If the ratio of the areas of two squares is 9 : 1, the ratio of their perimeters is:

- a) 9 : 1
- b) 3 : 1
- c) 3 : 4
- d) 1 : 3
- e) None of these

25). The ratio of the number of boys and girls in a school is 3 : 2. If 20% of the boys and 25% of the girls are scholarship holders, then the percentage of the students who did not get scholarship is:

- a) 68%
- b) 78%
- c) 82%
- d) 72%
- e) None of these



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26). In a mixture of 60 litres, the ratio of acid and water is 2 : 1. If the ratio of acid and water is to be 1 : 2, then the amount of water (in litres) to be added to the mixture is

- a) 50
- b) 45
- c) 55
- d) 60
- e) None of these

27). Salaries of Akash, Babloo and Chintu are in the ratio of 2 : 3 : 5. If their salaries were increased by 15%, 10% and 20% respectively, what will be the new ratio of their salaries?

- a) 3 : 3 : 10
- b) 23 : 33 : 60
- c) 20 : 22 : 40
- d) None of these
- e) Cannot be determined

28). If $x : y = 3 : 4$ then $(7x + 3y) : (7x - 3y)$ is equal to :

- a) 5 : 2
- b) 4 : 3
- c) 11 : 3
- d) None of these
- e) Cannot be determined

29). If $A : B = 5 : 7$; $C : D = 2A : 3B$ then $AC : BD$ is:

- a) 20 : 38
- b) 50 : 147
- c) 10 : 21
- d) None of these



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e) Cannot be determined

30). If $A : B = (1 / 2) : (3 / 8)$, $B : C = (1 / 3) : (5 / 9)$ and $C : D = (5 / 6) : (3 / 4)$ then the ratio $A : B : C : D$ is

- a) $6 : 4 : 8 : 10$
- b) $6 : 8 : 9 : 10$
- c) $8 : 6 : 10 : 9$
- d) $4 : 6 : 8 : 10$
- e) None of these

Answers:

1). c) 2). d) 3). b) 4). b) 5). b) 6). d) 7). b) 8). c) 9). b)

Solution:

21). Girls : Boys = 2 : 1. Total no. of students is 60

Girls $60 \times (2 / 3) = 40$ and boys = 20. Kamal has been ranked 17 which means there are 16 students before him of which 9 are girls remaining 7 are boys. 7 boys are ahead of Kamal + Kamal is the 8th boy, hence, there are $(20 - 8) = 12$ boys after him.

Answer: c)

22). Let the amount of rice be 1 kg and 2 kg. (The given ratio is 1 : 2). So, total cost = $10 \times 1 + 12 \times 2 = 10 + 24 = 34$

Rs. 34 is the cost of $(1 + 2 = 3)$ kg of rice.

Cost per kg = $(34 / 3) = 11.33$ per kg

Answer: d)

23). $A \propto C = A = K_1 C$

$B \propto C = B = K_2 C$



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Where K_1 and K_2 are constants

$$(A + B) = (K_1 + K_2)C$$

$(K_1 + K_2)$ is again a constants

$$(A + B) \propto C \quad \sqrt{(A \cdot B)} = \sqrt{[(K_1 C) \times (K_2 C)]} = \sqrt{(K_1 K_2 C^2)}$$

Here $\sqrt{(K_1 K_2)}$ is a constant $\Rightarrow \sqrt{(A \cdot B)} \propto C$

$$(A / B) = (K_1 C / K_2 C) = (K_1 / K_2)$$

(K_1 / K_2) is $(1 / K_2)$ a constant

$$\text{But, } (A - B) = (K_1 C - K_2 C) = (K_1 - K_2) C$$

$(K_1 - K_2)$ is a constant $\Rightarrow (A - B) \propto C$

Answer: b)

24). $(x^2 / y^2) = (9 / 1)$ where x and y are the sides of the two squares
= ratio of perimeters $\Rightarrow (x / y) = (3 / 1) \Rightarrow (4x / 4y) = (12 / 4) = (3 / 1)$

Answer: b)

25). Number of students in school = 100 (let)

$$\text{Boys} = (3 / 5) \times 100 = 60, \text{ Girls} = 40$$

Students who did not get scholarship

$$\text{Boys} = 60 \times (80 / 100) = 48$$

$$\text{Girls} = 40 \times (75 / 100) = 30$$

Students who do not get scholarship = 78

Required percentage = 78

Answer: b)

26). In 60 litres of mixture,

$$\text{Acid} = (2/3) \times 60 = 40 \text{ litres, Water} = 20 \text{ litres}$$

$$\text{If } x \text{ litres of water be mixed, then } [40 / (20 + x)] = 1/2 \Rightarrow 20 + x = 80$$

$$x = 80 - 20 = 60 \text{ litres}$$

Answer: d)

27). Required ratio = $[(2 \times 115) / 100] : [(3 \times 110) / 100] : [(5 \times 120) / 100]$



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230 : 330 : 600 → 23 : 33 : 60

Answer: b)

28). $(x / y) = (3 / 4)$

$$(7x + 3y) / (7x - 3y) = [7(x / y) + 3] / [7(x / y) - 3]$$

$$[7 \times (3 / 4) + 3] / [7 \times (3 / 4) - 3] = (21 + 12) / (21 - 12)$$

$$33 / 9 = 11 / 3 = 11 : 3$$

Answer: c)

29). $(A / B) = (5 / 7)$

$$(C / D) = (2 / 3) \times (A / B) = (2 \times 5) / (3 \times 7) = (10 / 21)$$

$$(AC / BD) = (5 / 7) \times (10 / 21) = 50 / 147$$

$$50 : 147$$

Answer: b)

30). $A : B = (1 / 2) : (3 / 8)$

$$= (1 / 2) / (3 / 8) = 8 / 6 = 4 / 3 = 4 : 3$$

$$B : C = (1 / 3) : (5 / 9) = (1 / 3) / (5 / 9) = 9 / (3 \times 5) = 3 / 5 = 3 : 5$$

$$A : B : C = 4 : 3 : 5 = 8 : 6 : 10$$

$$C : D = (5 / 6) : (3 / 4) = (5 / 6) / (3 / 4) = (5 / 6) \times (4 / 3) = 10 / 9 = 10 : 9$$

$$A : B : C : D = 8 : 6 : 10 : 9$$

Answer: c)



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