



MATHS

BOOKS - S CHAND IIT JEE FOUNDATION

RATIO AND PROPORTION

Example

1. If $p:q = r:s = t:u = 2:3$, then find
 $(mp + nr + ot) : (mq + ns + ou)$.

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2. If $x:y = 3:1$, then find the ratio $x - y : x + y$



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3. If $(x+y) : (x-y) = 4:1$, then find the ratio $(x^2 + y^2) : (x^2 - y^2)$



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4. Find the third proportional to $(x^2 - y^2)$ and $(x+y)$



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5. Three numbers A, B and C are in the ratio 1 : 2 : 3. Their average is 600. If A is increased by 10%. and B is decreased by 20%, then to get the average increased by 5%, C will be increased by 90 b. 100 c. 150 d. 180



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6. A began a business with Rs 120000 and B joined afterwards with Rs 60000. At the end of a year, the profit is divided in the ratio 4:1. When did B join?

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7. An employer reduces the number of his employees in the ratio of 9 : 8 and increases their wages in the ratio 14: 15. The difference in the amount of the total salary bill which was originally Rs. 1890 after the above two changes will be *Rs.*90
b. *Rs.*100 c. *Rs.*120 d. *Rs.*110

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8. In three vessels, the ratio of water and milk is 6:7, 5:9 and 8:7 respectively. If the mixtures of the three vessels are mixed together, then what will be the ratio of water and milk?

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9. In an express train, the number of passengers travelling in AC sleeper class, first class and sleeper class are in the ratio 1:2:3 and the fares of each classes are in the ratio 5:4:2. If the total income from this train is Rs 54000, then what is the income from AC sleeper class?

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10. A drum contains 20 litres of a paint. From this, 2 litres of paint is taken out and replaced by 2 litres of oil. Again 2 litres of this mixture is taken out and replaced by 2 litres of oil. If this operation is performed once again, then what would be the final ratio of paint and oil in the drum ?



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Question Bank 15

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

A. 1 : 2

B. 2 : 3

C. 3 : 4

D. 5:4

Answer: D



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2.

If

$a; b = c : d = e : f = 1 : 2$, then $(3a + 5c + 7e) : (3b + 5d + 7f)$

1:2 b. 1:4 c. 2:1 d. 8:7

A. 8:7

B. 2:1

C. 1:4

D. 1:2

Answer: D



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3. If $a:b=c$, then $a^4:b^4$ is equal to

A. $ac:b^2$

B. $a^2:c^2$

C. $c^2:a^2$

D. $b^2:ac$

Answer: B



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4. If $x:y = 3:2$, then the ratio $2x^2 + 3y^2 : 3x^2 - 2y^2$ is equal to

:

A. 12:5

B. 6:5

C. 30:19

D. 5:3

Answer: C



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5. If $a : b = c : d = e : f = 1 : 2$, then

$(pa + qc + re) : (pb + qd + rf)$ is equal to :

A. $p : (p + r)$

B. $(p + q) : r$

C. 2:3

D. 1:2

Answer: D



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6. If $a : (b + c) = 1 : 3$ and $c : (a + b) = 5 : 7$, the $b : (a + c)$ is equal to 1:2 b. 1:3 c. 2:3 d. 2:1

A. 1:2

B. 2:3

C. 1:3

D. 2:1

Answer: A



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7. If $p:q:r = 1:2:4$, then $\sqrt{5p^2 + q^2 + r^2}$ is equal to 5 b. $2q$
c. $5p$ d. $4r$

A. 5

B. $2q$

C. $5p$

D. $4r$

Answer: C



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8. The mean proportional between $(3 + \sqrt{2})$ and $(12 - \sqrt{32})$
is $\sqrt{7}$ b. $2\sqrt{7}$ c. $\sqrt{6}$ d. $\frac{15 - 3\sqrt{2}}{2}$

A. $\sqrt{7}$

B. $2\sqrt{7}$

C. 6

D. $\frac{15 - 2\sqrt{2}}{2}$

Answer: B



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9. If b is the mean proportional of a and c , then

$(a - b)^3 : (b - c)^3$ equals

A. $a^{3/2} : c^{3/2}$

B. $b^2 : c^2$

C. $a^2 : c^2$

D. $a^3 : b^3$

Answer: A



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10. If $x:a=y:b=z:c$ then

$$\frac{ax - by}{(a + b)(x - y)} + \frac{by - cz}{(b + c)(y - z)} + \frac{cz - ax}{(c + a)(z - x)} \quad \text{is}$$

equal to

A. 1

B. 2

C. 3

D. 0

Answer: C



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11. A sum of money is divided among A, B, C and D in the ratio 3:5:7:11 respectively. If the share of C is Rs 1668 more than the share of A, then what is the total amount of money of B and D together?

A. Rs 6762

B. Rs 6672

C. Rs 7506

D. Rs 6255

Answer: B



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12. If $a+b:b+c:c+a = 6:7:8$ and $a + b + c = 14$, then find c .

A. 6

B. 7

C. 8

D. 14

Answer: A



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13. A profit of Rs 6000 is to be distributed among A, B and C in the ratio 3: 4:5 respectively. How much more will C get than B?

A. Rs 500

B. Rs 1200

C. Rs 2000

D. Rs 2500

Answer: A



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14. Rs. 2010 are to be divided among A, B, C in such a way that if A gets Rs. 5, then B must get Rs. 12 and if B gets Rs. 4, then C must get Rs. 5.50. the share of C will exceed that of B by
Rs.270 b. Rs.360 c. Rs.430 d. Rs.620

A. Rs 620

B. Rs 430

C. Rs 360

D. Rs 270

Answer: D



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15. Rs. 180 are to be divided among 66 men and women. The ratio of the total amount of money received by men and women is 5:4. But the ratio of the money received by each man and woman is 3:2. The number of men is 20 b. 24 c. 30 d. 36

A. 20

B. 24

C. 30

D. 36

Answer: C



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16. An amount of 53 is divided among A, B and C such that A gets Rs. 7 more than B and B gets Rs. 8 more than C. What is the ratio of their shares? 15: 8: 30 b. 6: 9: 18 c. 18: 25: 10 d. 25: 18: 10

A. 16: 9: 18

B. 25: 18: 10

C. 18: 25: 10

D. 15: 8: 30

Answer: B



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17. 15 men, 18 women and 12 boys working together earned Rs. 2070: If the daily wages of a man, a woman and a boy are in the ratio of 4 : 3 : 2, the daily wages (in Rs.) of 1 man, 2 women and 3 boys are 135 b. 180 c. 2205 d. 240

A. 135

B. 180

C. 240

D. 205

Answer: C



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18. Krishnamurthy started business investing Rs 6000. Three months later Madhavan joined him investing Rs 4000. If they make a profit of Rs 5100 at the end of the year, how much should be Madhavan's share ?

- A. Rs 1700
- B. Rs 1400
- C. Rs 1300
- D. Rs 1732.75

Answer: A



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19. The incomes of A,B,C are in the ratio of 12: 9: 7 and their spendings are in the ratio 15: 9: 8. If A saves 25% of his income. What is the ratio of the savings of A,B and C?

A. 56: 99: 69

B. 69: 56: 99

C. 99: 56: 69

D. 99: 69: 56

Answer: A



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20. The employer reduces the number of employees in the ratio 9: 8 and increases their wages in the ratio 14: 15. If the

previous wage bill was Rs 189000, what is the amount by which the new wage bill will increase or decrease?

A. Rs 21000

B. Rs 10000

C. Rs 9000

D. Rs 25000

Answer: C



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21. Ratio of the incomes of A, B and C last year as 3:4:5. The ratio of their individual incomes of the last year and this year are 4:5, 2:3 and 3:4 respectively. If the sum of their present

incomes is Rs. 78800, then find the present individual incomes of A, B and C.

A. Rs 10000, Rs 40000, Rs 28800

B. Rs 18000, Rs 28800, Rs 32000

C. Rs 45000, Rs 12800, Rs 21000

D. Rs 20000, Rs 14600, Rs 44200

Answer: B



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22. The ratio of the ages of a man and his wife is 4:3. After 4 years, this ratio will be 9:7. If t the time of their marriage, the ratio f their ages was 5:3, then how many years ago were they

married? a. 8 years b. 10 years c. 12 years d. 15 years e. none of these

A. 12 years

B. 8 years

C. 10 years

D. 15 years

Answer: A



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23. A barrel contains a mixture of wine and water in the ratio 3 : 1. How much fraction of the mixture must be drawn off and substituted by water so that the ratio of wine and water in

the resultant mixture in the barrel becomes 1 : 1? $\frac{1}{3}$ b. $\frac{1}{4}$ c. $\frac{2}{3}$

d. $\frac{3}{4}$

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{3}{4}$

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

Answer: B



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24. There are three containers of equal capacity. The ratio of Sulphuric acid to water in the first container is 3: 2, that in the second container is 7:3 and in the third container it is 11:4

If all the liquids are mixed together, then the ratio of Sulphuric acid to water in the mixture will be:

- A. 61 : 29
- B. 61 : 28
- C. 60 : 29
- D. 59 : 29

Answer: A



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25. The students in three classes are in the ratio 2:3:5. If 20 students are increased in each class, the ratio changes to 4:5:7. Originally the total number of students was :

A. 100

B. 180

C. 200

D. 400

Answer: C



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26. Two identical vessels A and B contain mixtures of milk and water in the ratios 4:5 and 5:1 respectively in what ratio should quantities of mixtures be taken from A and b to form a mixture in which milk to water is in the ratio 5:4?

A. 2: 5

B. 2: 3

C. 4: 3

D. 5: 2

Answer: D



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27. A bottle is full of dettol. One-third of it is taken out and then an equal amount of water is poured into the bottle to fill it. This operation is done four times. Find the final ratio of dettol and water in the bottle

A. 13: 55

B. 20: 74

C. 16: 65

D. 10: 48

Answer: C



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28. In two alloys, copper and zinc are related in the ratio of 4:1 and 1:3. 10 kg of 1st alloy, 16 kg of 2nd alloy and some of pure copper are melted together. An alloy was obtained in which the ratio of copper to zinc was 3:2. Find the weight of the new alloy?

A. 35 kg.

B. 45 kg.

C. 40 kg.

D. 50 kg.

Answer: A



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29. Railway fares of 1st, 2nd and 3rd class between two stations were in the ratio of 8 : 6 : 3. The fares of 1st and 2nd class were subsequently reduced by $\frac{1}{6}$ and $\frac{1}{12}$ respectively. If during a year the ratio between the passengers of 1st, 2nd and 3rd classes was 9 : 12 : 26 and the total amount collected by the sale of tickets was Rs, 1088, then find the collection from the passengers of 1st class. *Rs.260* b. *Rs.280* c. *Rs.300*
d. *Rs.320*

A. `Rs 260

B. Rs 280

C. Rs 300

D. Rs 320

Answer: D



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30. Three containers A, B and C are having mixtures of milk and water in the ratio 1 : 5, 3 : 5 and 5 : 7 respectively. If the capacities of the containers are in the ratio 5 : 4 : 5, find the ratio of milk to water, if the mixtures of all the three containers are mixed together? 1: 115 b. 52: 115 c. 53: 115 d.

54: 115

A. 51: 115

B. 52: 115

C. 53: 115

D. 54: 115

Answer: C



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Self Assesement Sheet 15

1. A sum of Rs 4830 was divided among three persons P,Q and R such that if their shares were diminished by Rs 5, Rs 10 and Rs 15 respectively, the remainders would be in the ratio 3:4: 5.

What was P's share?

A. Rs 1200

B. Rs 1210

C. Rs 1205

D. Rs 1215

Answer: C



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2. By selling 144 tin boxes, Ram suffers a loss equal to SP of 6 boxes. If the total CP of boxes is 7200, then what is the SP of a box ?



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3. The contents of two vessels containing water and milk in the ratio 1:2 and 2: 5 are mixed in the ratio 1:4. The resulting mixture will have water and milk in the ratio:

A. 30: 75

B. 31: 74

C. 31: 75

D. 30: 74

Answer: B



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4. Ratio of the incomes of A, B and C last year as 3:4:5. The ratio of their individual incomes of the last year and this year

are 4:5, 2:3 and 3:4 respectively. If the sum of their present incomes is Rs. 78800, then find the present individual incomes of A, B and C.

A. Rs 18000

B. Rs 32000

C. Rs 28800

D. Cannot be determined.

Answer: C



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5. The expenses on rice, fish and oil of a family are in the ratio 12 : 17 : 3. The prices of these articles are increased by 20%, 30% and 50% respectively. The total expenses of family on

these articles are increased by $7\frac{1}{8}\%$ b. $14\frac{1}{8}\%$ c. $28\frac{1}{8}\%$ d.

$$6\frac{1}{8}\%$$

A. $14\frac{1}{8}\%$

B. $7\frac{1}{8}\%$

C. $56\frac{1}{8}\%$

D. $28\frac{1}{8}\%$

Answer: D



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6. The ratio of the ages of a man and his wife is 4:3. After 4 years, this ratio will be 9:7. If t the time of their marriage, the ratio f their ages was 5:3, then how many years ago were they

married? a. 8 years b. 10 years c. 12 years d. 15 years e. none of these

A. 12 years

B. 8 years

C. 10 years

D. 15 years

Answer: A



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7. Two identical vessels A and B contain mixtures of milk and water in the ratios 4:5 and 5:1 respectively in what ratio should quantities of mixtures be taken from A and b to form a mixture in which milk to water is in the ratio 5:4?

A. 2: 5

B. 2: 3

C. 4: 3

D. 5: 2

Answer: D



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8. Concentrations of three solutions A, B and C are 20%, 30% and 40% respectively. They are mixed in the ratio 3: 5: x resulting in a solution of 30% concentration. Find x.

A. 5

B. 2

C. 3

D. 4

Answer: C



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9. A precious stone worth Rs 6800 is dropped accidentally and breaks into three pieces: The weight of three pieces are in the ratio 5: 7: 8. The value of the stone is proportional to the square of its weight. Find the loss.

A. Rs 4260

B. Rs 4273

C. Rs 4454

D. Rs 3250

Answer: C



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10. A, B and C spend 70%, 75% and 80% respectively of their salaries. Their actual savings are in the ratio 4:5:6. What is the ratio of their salaries?

A. 4 : 5 : 6

B. 4 : 6 : 9

C. 5 : 5 : 4

D. 9 : 6 : 4

Answer: B



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