

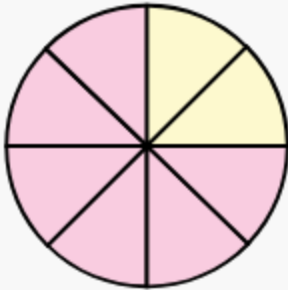
Ratio and Proportion

A ratio is the comparison or simplified form of two quantities of the same kind. This relation indicates how many times one quantity is equal to the other; or in other words, ratio is a number, which expresses one quantity as a fraction of the other. E.g. Ratio of 3 to 4 is 3 : 4. In this article we will learn the approach applicable to solve various problems on ratios and proportions. In the next few lines you will go through some important concepts related to ratio problems and the methods you should apply to solve those problems. We would like to mention here that you must solve some Ratio and Proportion worksheets to get expertise in this area, only then you would be comfortable in attempting the questions of this area in the exam.

The numbers forming the ratio are called terms. The numerator, “3”, in this case, is known as the antecedent and the denominator, “4”, in this case, is known as the consequent.

- **Equivalent Ratios** Let us divide a Pizza into 8 equal parts and share it between Ram and Sam in the ratio 2:6. The ratio 2:6 can be written as $\frac{2}{6}; \frac{2}{6} = \frac{1}{3}$ We know that $\frac{2}{6}$ and $\frac{1}{3}$ are called equivalent fractions. Similarly we call the ratios 2:6 and 1:3 as equivalent ratios. From a given ratio $x : y$, we can get equivalent ratios by multiplying the terms 'x' and 'y' by the same non-zero number.

For example



$$1 : 3 = 2 : 6 = 3 : 9$$

$$4 : 5 = 12 : 15 = 16 : 20$$

■ Ratio and Proportion Problems and Solutions

Example 1: Write any 4 equivalent ratios for 4 : 3.

Sol: Given Ratio = 4 : 3. The ratio in fractional form = $\frac{4}{3}$, we can get equivalent ratios by “4” and “3” by 2, 3, 4, 5 and get the equivalent fractions of $\frac{4}{3}$ are $\frac{8}{6}$, $\frac{12}{9}$, $\frac{16}{12}$, $\frac{20}{15}$,

∴ The equivalent ratios of 4 : 3 are 8 : 6, 12 : 9, 16 : 12, 20 : 15

Example 2: Distribute Rs. 320 in the ratio 1 : 3.

Sol: 1 : 3 means the first quantity is 1 part and the second quantity in 3 parts.

The total number of parts = $1 + 3 = 4$. As 4 parts = Rs. 320

\therefore 1 part = $320/4 = 80$ \therefore 3 parts = $3 \times 80 = \text{Rs. } 240$

■ **If a : b is a ratio then:**

- ✓ Duplicate ratio of (a : b) is $(a^2 : b^2)$.
- ✓ Sub-duplicate ratio of (a : b) is $(a^{1/2} : b^{1/2})$.
- ✓ Triplicate ratio of (a : b) is $(a^3 : b^3)$.
- ✓ Sub-triplicate ratio of (a : b) is $(a^{1/3} : b^{1/3})$.

Example 3: What is the duplicate ratio of 2 : 3?

Sol: Duplicate ratio of 2 : 3 = $2^2 : 3^2 = 4 : 9$.

Example 4: Triplicate ratio of two numbers is 27 : 64. Find their duplicate ratio.

Sol: Triplicate ratio of two numbers is 27 : 64, so numbers should be $27^{1/3} : 64^{1/3}$ So numbers are in the ratio 3 : 4. So duplicate ratio of 3 : 4 = $3^2 : 4^2 = 9 : 16$.

Example 5: The ratio of two numbers is 25 : 36. Find their sub duplicate ratio.

Sol: Sub duplicate ratio of 25 : 36 = $25^{1/2}$: $36^{1/2}$ = 5 : 6.

■ PROPORTION

Proportion is represented by the symbol '= 'or ':: '.

If the ratio $a : b$ is equal to the ratio $c : d$, then a, b, c, d are said to be in proportion.

Using symbols we write as $a : b = c : d$ or $a : b :: c : d$

- When 4 terms in proportion, then the product of the two extremes (i.e. the first and the fourth value) should be equal to the product of two middle values (i.e. the second and the third value)

Example 6: Prove that 16 : 12 and 4 : 3 are in proportion.

Sol: The product of the means = $12 \times 4 = 48$. The product of the extremes = $16 \times 3 = 48$

Product of Means = Product of Extremes 16 : 12, 4 : 3 are in proportion.

Example 7: Find the missing number in $3 : 4 = 12 : \underline{\hspace{2cm}}$

Sol: Let the missing number is "a". We know that, Product of means = Product of extremes.

Therefore $3 \times a = 4 \times 12$; By dividing both sides by 3, we get the missing term = $(4 \times 12)/3 = 16$

Example 8: Taking 4 and 16 are means, write any two proportions.

Sol: Given 4 and 16 are means. So, $__ : 4 = 16 : __$

The product of Means is $4 \times 16 = 64$. Hence the product of Extremes must also be 64

64 can be written as 4×16 or 2×32 etc. Two proportions are $2 : 4 :: 16 : 32$ and $16 : 4 :: 16 : 4$.

■ **FOURTH PROPORTIONAL:**

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

Example 9: Find the fourth proportional of the numbers 12, 48, 16.

Sol: Let fourth proportional is x . Now as per the concept above the product of extremes should be equal to the product of the means $\rightarrow 12/48 = 16/x \rightarrow x = 64$.

■ **THIRD PROPORTIONAL:** $a : b = c : d$, then c is called the third proportion to a and b .

Example 10: If 2, 5, x , 30 are in proportion, find the third proportional " x ".

Sol: Here x is third proportional. According to the concept $2/5 = x/30 \rightarrow x = 12$.

■ **MEAN PROPORTIONAL:** Mean proportional between a and b is \sqrt{ab}

Example 11: Find the mean proportional of the numbers 10 and 1000.

Sol: Mean proportional between a and b is \sqrt{ab} . Let the mean proportional of 10 and 1000 be x.

So $x = \sqrt{10 \times 1000} = \sqrt{10000} = 100$.

■ CONTINUED PROPORTION a, b, c are in **Continued Proportion** if $a : b = b : c$. Here b is called the **Mean Proportional** and is equal to the square root of the product of a and c. $b^2 = a \times c \rightarrow b = \sqrt{ac}$

■ $a/b = b/c = c/d$ etc., then a, b, c, d are in Geometric Progression.

Let $a/b = b/c = c/d = k$, then, $c = dk$; $b = ck$ and $a = bk$

Since $c = dk$, $b = dk \times k = dk^2$ and $a = bk = dk^2 \times k = dk^3$, implying they are in Geometric Progression.

If the three ratios, $a : b$, $b : c$, $c : d$ are known, we can find $a : d$ by the multiplying these three ratios

$$a/d = a/b \times b/c \times c/d$$

■ If $a/b = c/d = e/f$, then each of these ratios is equal to $(a+c+e)/(b+d+f)$

■ If $a/b = c/d$, then $b/a = d/c$ (Invertendo)

■ If $a/b = c/d$, then $a/c = b/d$ (Alternendo)

■ If $a/b = c/d$, then $(a+b)/b = (c+d)/d$ (Componendo)

■ If $a/b = c/d$, then $(a-b)/b = (c-d)/d$ (Dividendo)

■ If $a/b = c/d$, then $(a+b)/(a-b) = (c+d)/(c-d)$, (Componendo & dividendo)

Example 12: If $a : b = 2 : 5$, then find the value of $(3a + 4b) : (5a + 6b)$.

Sol: Let $a = 2x$ & $b = 5x$. Then $(3a + 4b) : (5a + 6b) = (3 \times 2x + 4 \times 5x) : (5 \times 2x + 6 \times 5x) \rightarrow 26x : 40x = 13 : 20$.

- **DIRECT VARIATION** Two quantities “x” and “y” are said to be in direct variation if an increase in one quantity results in increase in the other quantity and decrease in one results in decrease in the other quantity. If two quantities vary always in the same ratio, then they are in direct variation.

Examples for Direct Variation:

1. Distance and Time are in Direct Variation, because more the distance travelled, the time taken will be more (if speed remains the same).
2. Principal and Interest are in Direct Variation, because if the Principal is more, the Interest earned will also be more.
3. Purchase of Articles and the amount spent are in Direct Variation, because purchase of more articles will cost more money. If two quantities “x” and “y” vary directly in such a way that x/y remains constant and is positive, and this constant is called the constant of variation. If $x \propto y$ that means $x = py$ where p is proportionality constant $x/y = p$, then ratio of any two values of “x” is equal to the ratio of corresponding values of “y” Then $x_1/x_2 = y_1/y_2$.

Example 13: Sam takes 2 hours to cover 40 km. Find the distance he will travel in 8 hours.

Sol: Let distance covered = y . When time increases the distance also increases. Therefore, they are in direct variation, $2 : 8 = 40 : y \rightarrow y = (40 \times 8)/2 = 160$ km. Sam will travel 160 km in 8 hours.

Example 14: The purchase price of 15 articles is Rs 4500. Find number of articles purchased for Rs. 1500.

Sol: Let articles purchased = x . When amount spent decreases, then number of articles also decreases. So they are in direct variation $\rightarrow 15 : x = 4500 : 1500 \rightarrow x = (15 \times 1500) / 4500 = 5$

Example 15: The cost of 10 kg sugar is Rs 360. Find the cost of 18.5 kg sugar.

Sol: Let the cost is Rs. X . When quantity increases, cost also increases. So they are in direct variation $\rightarrow 10/18.5 = 360/X \rightarrow X = 666$

■ INVERSE VARIATION:

If two quantities “x” and “y” are such that an increase or decrease in “x” leads to a corresponding decrease or increase in “y” in the same ratio, then we can say they vary indirectly or the variation is inverse. Suppose 6 men can do a piece of work in 18 days, then 12 men can do the same job in 9 days. That means if we double the number of men, then number of days get halved. That means there is inverse relation between number of men and number of days.

In general, when two variables x and y are such that $xy = k$ where k is a non-zero constant, we say that y **varies inversely** with x. In notation, inverse variation is written as $y \propto 1/x \rightarrow y = p/x$, where p is constant of proportionality $\rightarrow xy = p$. So $x_1y_1 = x_2y_2$.

Examples for Inverse Variation:

1. Work and Time are in Inverse Variation, because more the number of the workers, lesser will be the time required to complete a job.
2. Speed and Time are in Inverse Variation, because higher the speed, the lower is the time taken to cover a distance.
3. Population and Quantity of food are in Inverse Variation, because if the population increases, the food availability decreases.

Example 16: Suppose that y varies inversely as x and that $y = 12$ when $x = 6$.

a) Form an equation connecting x and y .

b) Calculate the value of y when $x = 18$.

Sol: x and y are in inverse proportion. So $x_1y_1 = x_2y_2 \rightarrow 6 \times 12 = 18 \times y \rightarrow y = 4$

Ratio and Proportion Questions and

Answers:

Q.1 If $(4x-3y) : (2x+5y) = 12 : 19$ then $x : y$ is.....

(A) 2:3

(B) 1 : 2

(C) 3 : 2

(D) 2 : 1

Answer

Ans . C

Q.2 If $x/5 = x/8$, then $(x + 5) : (x + 8)$ is equal to.....

(A) 3 : 5

(B) 13:8

(C) 8:5

(D) 5:8

Answer

Ans . D

Q.3 If $x : y = 6 : 5$, then $(5x+3y) : (5x-3y)$ is equal to.....

(A) 2 : 1

(B) 3 : 1

(C) 5 : 3

(D) 5 : 2

Answer

Ans . B

Q.4 What same number must be added to each term of the ratio 7 : 3 so that the ratio becomes 2 : 3?

(A) 1

(B) 2

(C) 5

(D) can't be determined

Answer

Ans . D

Q.5 The ratio of the two numbers is 3 : 4 and their sum is 420. The greater of the two numbers is.....

(A) 175

(B) 200

(C) 240

(D) 315

Answer

Ans . C

Q.6 Five bananas and four apples cost as much as three bananas and seven apples. The ratio of the cost of one banana to that of one apple is.....

(A) 3 : 2

(B) 4 : 3

(C) 3 : 4

(D) 1 : 3

Answer

Ans . A

Q.7 The speeds of three cars are in the ratio 5 : 4 : 6 . The ratio between the times 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

Answer

Ans . D

Q.8 A dog takes 3 leaps for every 5 leaps of a hare. If one leap of the dog is equal to 3 leaps of the hare, the ratio of the speed of the dog to that of the hare.....

(A) 8 : 5

(B) 9 : 5

(C) 8 : 7

(D) 9 : 7

Answer

Ans . B

Q.9 Rs. 180 contained in a box consists of one rupee, 50 paise and 25 paise coins in the proportion of 2 : 3 : 4. What is the number of 50 paise coins?

(A) 120

(B) 150

(C) 180

(D) 240

Answer

Ans . A

Q. 10 In a school, 10% of the boys are same in number as $\frac{1}{4}$ of the girls and 10% of the girls are same in number as $\frac{1}{25}$ of the boys. What is the ratio of boys to girls in that school?

(A) 3 : 2

(B) 5 : 2

(C) 2 : 1

(D) 4 : 3

Answer

Ans . B

Q.11 Two numbers are in the ratio 3 : 4 and the product of their LCM and HCF is 10800. The sum of the numbers is.....

(A) 180

(B) 210

(C) 225

(D) 240

Answer

Ans . B

Q. 12 The ages of x and y are in the ratio of 3 : 1. 15 years hence, the ratio will be 2 : 1. Their present ages (in years) are.....

(A) 30, 10

(B) 45, 15

(C) 21, 7

(D) 60, 20

Answer

Ans . B

Q.13 Gold is 19 times as heavy as water and copper is 9 times as heavy as water. In what ratio should there be mixed to get 15 times as heavy as water.

(A) 1 : 1

(B) 2 : 3

(C) 1 : 2

(D) 3 : 2

Answer

Ans . D

Q.14 85 liters of a mixture contains milk and water in the ratio 27 : 7. How much water is to be added to get a new mixture containing milk and water in the ratio 3 :1?

- (A) 5 lt
- (B) 6.5 lt
- (C) 7.25 lt
- (D) 8 lt

Answer

Ans . A

Q.15 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, then ratio of gold and copper in C will be....

- (A) 5 : 9
- (B) 5 : 7
- (C) 7 : 5
- (D) 9 : 5

Answer

Ans . C

Q.16 A mixture contains milk and water in the ratio 5 : 1. On adding 5 liters of water, the ratio of milk to water becomes 5 : 2. The quantity of milk in the original mixture is....

(A) 16 lt.

(B) 25 lt.

(C) 22.75 lt.

(D) 32.5 lt.

Answer

Ans . B

Q.17 The LCM and HCF of two numbers x and y are l and h respectively. Then....

(A) $l : h = x : y$

(B) $x : h = l : y$

(C) $x : l = y : h$

(D) $x : h = y : l$

Answer

Ans . B

Q. 18 If $a + b : b + c : c + a = 6 : 7 : 8$ and $a + b + c = 14$, then the value of c is.....

(A) 6

(B) 7

(C) 8

(D) 14

Answer

Ans . A

Q.19 Which of the following is greatest $3 : 4$, $5 : 6$, $6 : 7$, $4 : 5$?

(A) $3 : 4$

(B) $4 : 5$

(C) $5 : 6$

(D) $6 : 7$

Answer

Ans . D

Q.20 The ratio between the numbers is 3 : 4 and the sum of their squares is 625. The numbers are.....

- (A) 6, 8
- (B) 15, 20
- (C) 18, 24
- (D) 20, 25

Answer

Ans . B

Q.21 If $A : B = 5 : 7$ and $B : C = 9 : 11$, then $A : C$?

- (A) 9 : 11
- (B) 45 : 77
- (C) 45 : 66
- (D) 39 : 77

Answer

Ans . B

Q.22 The mean proportion between 9 and 25 is.....

- (A) 10

(B) 12

(C) 15

(D) 17

Answer

Ans . C

Q.23 The third proportion to 12 and 30 is.....

(A) 40

(B) 45

(C) 50

(D) 75

Answer

Ans . D

Q.24 The ratio of milk and water in 66 kg of adulterated milk is 5 : 1.

Water is added to it to make the ratio 5 : 3. The quantity of water added is.....

(A) 12

(B) 32

(C) 32

(D) 52

Answer

Ans . D

Q.25 Ratio of speed of three cars is 2 : 3 : 4. The ratio of time taken by these cars to travel the same distance is.....

(A) 2 : 3 : 4

(B) 3 : 6 : 4

(C) 6 : 4 : 3

(D) 4 : 3 : 6

Answer

Ans . C

Q.26 A cup contains milk and water in the ratio of 3 : 1. How much mixture should be taken out and water added to make the ratio 1 : 1?

(A) $\frac{1}{3}$

(B) $\frac{1}{4}$

(C) $\frac{1}{2}$

(D) $\frac{1}{5}$

Answer

Ans . A

Q.27 A can contains a mixture of two liquid A and B in proportion 7 : 5 . When 9 liters of mixture was drawn off and the can was filled with B,

the proportion of A and B becomes 1 : 2. How many liters of mixtures was contained by the can initially?

- (A) 15
- (B) 21
- (C) 36
- (D) 25

Answer

Ans . B

Q.28 Five apples plus four pears costs as much as three apples plus seven pears. What is the ratio of the cost of 1 pear and cost of 1 apple?

- (A) 2 : 3
- (B) 3 : 4
- (C) 3 : 1
- (D) 4 : 3

Answer

Ans . A

Q.29 The ratio of the perimeter of an equilateral triangle having and altitude equal to the radius of a circle, to the perimeter of an equilateral triangle inscribed in a circle is.....

- (A) 1 : 2
- (B) 1 : 3
- (C) 1 : $\sqrt{3}$
- (D) $\sqrt{3}$: 2

Answer

Ans . B

Q.30 The areas of two triangles of equal height are in the ratio of 7 : 12. If the base of the smaller triangle is 40 cm, then the base of the other is.....

- (A) 23.33
- (B) 21 cm
- (C) 68.75 cm
- (D) 32.33 cm

Answer

Ans . C

Q.31 x and y are in the same proportion as (10 – x) and (15 – y), if x = 12, then y is equal to.....

- (A) 18
- (B) 12.2
- (C) 8

(D) 2.5

Answer

Ans . A

Q.32 At a certain party, first the ratio of boys to girls was 5 : 3. If after 10 boys left, the ratio becomes 1 : 1. How many people were originally at the party?

(A) 48

(B) 32

(C) 64

(D) 40

Answer

Ans . D

Q.33 A cylinder, a hemisphere and a cone are on the same base and have the same height, the area of the curved surface are in the ratio of

.....

(A) 1 : 1 : 2

(B) $\sqrt{2}$: $\sqrt{2}$: 2

(C) $\sqrt{2}$: $\sqrt{2}$: 1

(D) 1 : 1 : $\sqrt{2}$

Answer

Ans . C

Q.34 Square A is formed with the diagonal of square B as its sides and square. B has the diagonal of square C as its side? Find the ratio of the area of square C to square A?

- (A) 1 : 4
- (B) 1 : 2
- (C) 1 : $\sqrt{2}$
- (D) 1 : $2\sqrt{2}$

Answer

Ans . A

Q.35 Two regular polygons have the number of their sides in the ratio 2 : 1 and their interior angle in the ratio 5 : 4. The number of sides of the two polygons are.....

- (A) 10, 5
- (B) 8, 4
- (C) 12, 6
- (D) 6, 3

Answer

Ans . C

Q.36 The ratio of the prices of the two prices of two houses A and B was 4 : 5 last year. This year, the price of A increased by 25% and that of B by Rs. 50,000. If their prices now are in the ratio 9 : 10, the price of A last year was.....

- (A) Rs. 3,60,000
- (B) Rs. 4,50,000
- (C) Rs. 4,80,000
- (D) Rs. 5,00,000

Answer

Ans . A

Q.37 The wages of labourers in a factory increased in the ratio 22 : 25 and there was a reduction in the number of labourers in the ratio 15 : 11. Find the original wage bill if the present bill is Rs. 5000?

- (A) Rs. 6000
- (B) Rs. 3000
- (C) Rs. 4800
- (D) Rs. 4500

Answer

Ans . B

Q. 38 Two casks of liquid contain liquid of mixture of liquids A and B. In the first flask $A:B::7:3$ and in the second cask $A:B::3:1$. In what ratio must the mixtures from the two casks be taken to give a mixture in which $A:B::11:4$?

- (A) 1 : 2
- (B) 1 : 3
- (C) 2 : 3
- (D) 2 : 1

Answer

Ans . A

Q. 39 If $a : b : c :: 2 : 4 : 3$, find the ratio of the square of the average to the average of their square.

- (A) 23 : 25
- (B) 8 : 3
- (C) 25 : 27
- (D) 27 : 29

Answer

Ans . A

Q.40 Five years back two friends age was in the ratio 5 : 1 and 30 years hence the ratio would be 10 : 9. Find the age of the younger friend five years hence.

- (A) 11 years
- (B) 12 years
- (C) 14 years
- (D) 15 years

Answer

Ans . D

Q.41 A, B, C invest in the ratio 2 : 3 : 5. The return on their investment re in the ratio 9 ; 8 : 6. Find the total earning if C earns Rs. 1200 more than A.

- (A) Rs. 7200
- (B) Rs. 7500
- (C) Rs. 8000
- (D) Rs. 8100

Answer

Ans . D

Q.42 In an exam, the ratio of passes to failure was 4 : 1. Had 30 less appeared and 20 less passed, the ratio of passes to failure would have been 5 : 1. The number of students who appeared for the exam is.....

(A) 120

(B) 135

(C) 145

(D) 150

Answer

Ans . A

Q.43 A, B and C share a sum of money in the ratio 2 : 3 : 4. If they had in the ratio 3 : 4 : 5, 'A' would have got Rs. 1 more. How much would 'B' gain/lose by the new ratio?

(A) gain Rs. 1

(B) loss Rs 1

(C) no gain or loss

(D) none of them

Answer

Ans . D

Q.44 The incomes of A, B and C are in the ratio of 7: 9: 12 respectively and their spending are in the ratio 8: 9: 15 respectively. If A saves $\frac{1}{4}$ of his income, then the saving of A, B, C are in the ratio.....

(A) 56: 99: 69

(B) 99: 56: 69

(C) 69: 56: 99

(D) 49: 69: 56

Answer

Ans . C

Q.45 I have 100 coins with me which I want to divide into two groups such that one fourth of a group would be 20 coins more than $\frac{1}{6}$ th the number of coins in the second group. The ratio of coins in the two group is.....

(A) 4

(B) 5: 2

(C) 18: 7

(D) 22: 3

Answer

Ans . A

Q.46 Find the number which when added to each of the numbers 6, 8, 10, 13 will make them proportional.

(A) 1.5

(B) 2

(C) 3

(D) 4

Answer

Ans . D

Q.47 A man divides two sums of money among four sons R, S, T, U. The first in the ratio 4: 3: 2: 1 and the second in the ratio 5: 6: 7: 8. If the second sum of money is twice the first sum, which son receive the largest total?

(A) R

(B) S

(C) T

(D) U

Answer

Ans . B

Q.48 Find the value of x , when x is a mean proportion between $x-2$ and $x+6$.

(A) 3

(B) 6

(C) 2

(D) 4

Answer

Ans . A

Q.49 What number must be added to the numbers 2, 18, 22, 58 or that the result is in proportion?

(A) 14

(B) 12

(C) 16

(D) 18]

Answer

Ans . A

Q.50 If a carton containing 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) 1: 1

Answer

Ans . C

Q.51 A certain ship floats with $\frac{3}{5}$ of its weight above the water. What is the ratio of the ship's submerged weight to its exposed weight?

(A) 3: 8

(B) 2: 5

(C) 3: 5

(D) 2: 3

Answer

Ans . D

Q.52 Ratio of boys to girls in a class is 5: 3. Which of these cannot be the number of students in the class?

(A) 32

(B) 40

(C) 36

(D) 56

Answer

Ans . D

Q.53 A student finishes the first half of an exam in two thirds of the time it takes him to finish the second half. If the whole exam takes him an hour and half, how many minutes does he spend on the second half of the exam?

(A) 36

(B) 54

(C) 60

(D) 44

Answer

Ans . C

Q.54 A servant is paid a total of Rs. 100 and a turban for a full year's service. If the works for only 9 months and received in return Rs. 65 + turban. What is the value of the turban?

- (A) Rs. 9
- (B) Rs. 10
- (C) Rs. 40
- (D) Rs. 50

Answer

Ans . B

Q.55 A student took 3 papers the full marks of which were in the ratio 1: 2 : 3. His marks in these papers were in proportion of 6; 7: 8. He obtained 60% aggregate. The number of papers in which he obtained more than 50% marks was....

- (A) 1
- (B) 2
- (C) data inconsistent
- (D) None of these

Answer

Ans . A

Q. 56 Ram gives $\frac{1}{5}$ of his income to his mother, $\frac{2}{5}$ of the remainder to his brother and his sister and 140 rupees to his friends. Now if he is left with $\frac{1}{5}$ th of his earnings, find his earnings.

(A) Rs. 600

(B) Rs. 500

(C) Rs. 875

(D) Rs. 1100

Answer

Ans . B

Q.57 A covers a circular track in 15 minutes while B does so in 25 minutes. In how much time will 'A' and 'B' be together again? (They start running in the same direction from the same point.)

(A) 75 min

(B) 50 min

(C) 45 min

(D) 37.5 min

Answer

Ans . D

Q.58 50 men can do a job working 10 hours per day in 8 days. If 20 boys and 15 girls work 15 hours per day, in how many days can the job completed. Given that boys and girls work equally hard and each of them work half as hard as a man.

(A) 15.24 days approx.

(B) 20 days

(C) 12 days

(D) None of these

Answer

Ans . D

Q.59 The incomes of A and B are in the ratio of 3: 2 and their expenditures are in the ratio of 5: 3. If each saves Rs. 1000, their incomes are.....

(A) 6000, 4000

(B) 12000, 8000

(C) 15000, 10000

(D) None of these

Answer

Ans . A

Q.60 An alloy of tin and copper has 6 pounds of copper for every 4 pounds of tin. If 300 pounds of this alloy is made, how many pounds of tin need to be added in order to make the ratio of tin and copper 1:17?

- (A) 30
- (B) 60
- (C) 90
- (D) 120

Answer

Ans . B

Q.61 If $a = 2b$, $\frac{1}{2} b = c$, and $4c = 3d$, then what is the ratio of d to a ?

- (A) $\frac{1}{3}$
- (B) $\frac{3}{4}$
- (C) 1
- (D) $\frac{4}{3}$

Answer

Ans . A

Q.62 A year ago a father was four times his son's age. In 6 years, his age will be 9 more will be more than twice his son's age. The present age of the son is.....

(A) 30 yrs.

(B) 9 yrs.

(C) 20 yrs

(D) 11 yrs

Answer

Ans . B

Q.63 The ratio of incomes of Vijay ad Sujith is 3 : 5 and ratio of their expenditure is 5 : 1. Who saves more?

(A) Vijay

(B) Sujith

(C) cannot be determined

(D) none of these

Answer

Ans . B

Q.64 The ratio of incomes of Nupur and Divya is 1: 2 and ratio of their expenditure is 2: 3. Who saves more? (You again have to assume that these girls do not take any loan from anywhere).

- (A) Nupur
- (B) Divya
- (C) Cannot be determined
- (D) None of these

Answer

Ans . C

Q.65 The ratio of sum of squares of first n natural numbers to square of sum of first n natural number 17: 325, the value of n is.....

- (A) 15
- (B) 20
- (C) 35
- (D) None of these

Answer

Ans . B

Q.66 A certain distance is covered at a particular speed. If half this distance is covered in double the time the ratio of the two speeds is....

(A) 4: 1

(B) 1:4

(C) 2: 1

(D) 1: 2

Answer

Ans . A

Q.67 A train starts from station P at 7 am and moves at 60 kmph towards Q. At 1 pm another train starts from Q towards P at 80 kmph. When do the two trains, meet, if the distance between P and Q is 1200 km?

(A) 6 pm

(B) 7 pm

(C) 8 pm

(D) None of these

Answer

Ans . B

Q.68 In above problem at what distance from Q do the two trains meet?

- (A) 360 km
- (B) 720 km
- (C) 480 km
- (D) None of these

Answer

Ans . C

Q,69 A 150 m long train crosses a man walking at a speed of 6 kmph in the opposite direction in 6 seconds. The speed of the train (in kmph) is.....

- (A) 66
- (B) 84
- (C) 96
- (D) 106

Answer

Ans . B

Q.70 If I can walk a certain distance in 50 days when I rest 9 hours each day, how long will it take me to walk twice as far if I walk twice as fast and rest twice as long each day?

- (A) 75
- (B) 100
- (C) 125
- (D) 150

Answer

Ans . C

Q.71 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 salary?

- (A) Rs. 17,000
- (B) Rs. 20,000
- (C)Rs. 25,500
- (D) Rs. 38,000

Answer

Ans . D

Q.72 The sum of three numbers is 98. If the ratio of the first to 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

Answer

Ans . B

Q.73 Vinod have 20 rupees. He bought 1, 2, 5 rupee stamps. They are different in numbers by the reason of no change, the shop keeper gives 3 one rupee stamps. So how many stamps Vinod have ?

(A) 10

(B) 18

(C) 12

(D) 15

Answer

Ans . A

Q.74 There are two containers, the first one contains 1 litre pure water and the second one contains 1 litre pure milk. Now 5 cups of water from the first container is taken out is mixed well in the second container. Then, 5 cups of this mixture is taken out and is mixed in the first container. Let A denote the proportion of milk in the first container and B denote the proportion of water in the second container then:

- (A) A
- (B) $A=B$
- (C) $A>B$
- (D) can't be determined

Answer

Ans . B

Q.75 The ratio of the number of boys and girls in a college is 7 : 8. If the percentage increase in the number of boys and girls be 20% and 10% respectively, what will be the new ratio?

- (A) 8 : 9
- (B) 17 : 18
- (C) 21 : 22
- (D) Cannot be determined

Answer Ans . C

Q.76 If $0.75 : x :: 5 : 8$, then x is equal to:

(A) 1.12

(B) 1.2

(C) 1.25

(D) 1.5

Answer

Ans . B

Q.77 If Rs. 782 be divided into three parts, proportional to $1 : 2 : 3$, then the first part is:

(A) Rs. 182

(B) Rs. 190

(C) Rs. 196

(D) Rs. 204

Answer

Ans . D

Q.78 A mixture contains alcohol and water in the ratio 4:3. If 5 liters of water is added to the mixture, the ratio becomes 4:5. Find the quantity of alcohol in the given mixture.

- (A) 8 Liters
- (B) 10 Liters
- (C) 18 Liters
- (D) 22 Liters

Answer

Ans . B

Q.79 The incomes of two persons A and B are in the ratio 3 : 4. If each saves Rs.100 per month, the ratio of their expenditures is Rs. 1 : 2. Find their incomes.

- (A) Rs. 100 and Rs.150
- (B) Rs. 150 and Rs.200
- (C) Rs.200 and Rs.250
- (D) Rs.250 and Rs.300

Answer

Ans . B

Q.80 Three cats are roaming in a zoo in such a way that when cat A takes 5 steps, B takes 6 steps and C takes 7 steps. But the 6 steps of A are equal to the 7 steps of B and 8 steps of C. What is the ratio of their speeds?

(A) 140:144:147

(B) 40:44:47

(C) 15:21:28

(D) 252:245:240

Answer

Ans . A

81. When a sum of money was equally distributed among 49 children, each child received Rs. 20. If the same amount is equally distributed among children, such that each child gets Rs. 3.5, find the number of children.

A. 280

B. 246

C. 245

D. 240

Option A

Number of children $\propto \frac{1}{\text{Amount}} \Rightarrow N \propto \frac{1}{A} \Rightarrow N = \frac{k}{A}$

$$49 = \frac{k}{20} \quad K = 49 \times 20 \Rightarrow N = \frac{49 \times 20}{3.5} = 280.$$

82. The cost of a diamond varies as the square of its weight. A diamond weighing 20 decigrams costs Rs. 4,800. Find the cost of a diamond of the same kind weighing 8 decigrams.

A. Rs. 762

B. Rs. 760

C. Rs. 764

D. Rs. 768

Option D

$$C \propto W^2 \Rightarrow C = kW^2.$$

$$4800 = k(20)^2 \Rightarrow k = 12.$$

$$\text{Now } C = 12(8)^2 \Rightarrow C = 768.$$

83. The ratio of two numbers is 9 : 5. If 9 is added to the greater number and 5 is subtracted from the smaller number, the greater number becomes thrice the smaller one. Find the numbers.

- A. 72, 40
- B. 18, 10
- C. 36, 20
- D. None of these

Option C

Present ratio = 9 : 5. \therefore actual values are $9x$ and $5x$.

Hence $9x + 9 : 5x - 5 = 3 : 1 \Rightarrow x = 4$. \therefore numbers are $9(4) = 36$ and $5(4) = 20$.

84. Find the ratio of the diagonal of a square of side 30 cm, to its side.

A. $\sqrt{2}: 3$

B. $\sqrt{3}: 4$

C. $1 : \sqrt{2}$

D. $\sqrt{2}: 1$

Option D

Diagonal of a square = $\sqrt{2}$ side. Hence this is the required ratio. So the required ratio is $\sqrt{2}: 1$.

85. The ratio of the first and second-class fares between the two stations is 6 : 4 and the number of passengers traveling by first and second-class is 1 : 30. If Rs. 2100 is collected as fare, what is the amount collected from first class passengers?

- A. Rs.250
- B. Rs. 200
- C. Rs. 150
- D. Rs. 100

Option D

Ratio of the amounts collected from 1st and 2nd class = $(6 \times 1) : (4 \times 30) =$

$1 : 20$. \therefore Amount collected from 1st class passengers = $\frac{1}{21} \times 2100 = 100$.

86. The ratio of A's salary to B's was 4 : 5. A's salary is increased by 10% and B's by 20%, what is the ratio of their salaries now?

- A. 14:11
- B. 15:14
- C. 11:15
- D. None of these

Option C

Present ratio = 4 : 5. Increase of 10% and 20%. New ratio of salaries will be $4 \times 1.1 : 5 \times 1.2 = 11 : 15$.

87. 200 g of 25% sulphuric acid solution was added to 300 g of 40% sulphuric acid solution. Find the concentration of the acid in the mixture.

- A. 14%
- B. 24%
- C. 44%
- D. 34%

Option D

Amount of acid in the 1st solution = $0.25 \times 200 = 50$ g.

Amount of acid in the 2nd solution = $0.4 \times 300 = 120$ g.

Total amount of acid = $50 + 120 = 170$ g. \therefore Required concentration = $170 / (200 + 300) \times 100 = 34\%$

88. In one alloy there is 60% gold in its total mass, while in another alloy it is 35%. 12 kg of the first alloy was melted together with 8 kg of the second one to form a third alloy. Find the percentage of gold in the new alloy.

- A. 50%
- B. 49%
- C. 45%
- D. 48%

Option A

Amount of gold in 1st alloy = $0.6 \times 12 = 7.2$ kg. Amount of gold in 2nd alloy = $0.35 \times 8 = 2.8$ kg.

\therefore required % age of gold = $(7.2 + 2.8) / (12 + 8) \times 100 = (10 / 20) \times 100 = 50 \%$.

89. Divide Rs. 390 among 3 persons A, B and C such that 3 times A's share, 2 times B's share and 4 times C's share are all equal. The shares of A, B and C are respectively

A. Rs. 120, Rs. 180, Rs. 90

B. Rs. 60, Rs. 90, Rs. 45

C. Rs. 240, Rs. 157, Rs. 90

D. None of these

Option A

$$3A = 2B = 4C. \text{ Also } A + B + C = 390. \therefore A + \frac{3A}{2} + \frac{3A}{4} = 390$$

$$\Rightarrow (4 + 6 + 3)A = 390 \times 4 \Rightarrow A = 120, \therefore B = 180 \text{ and } C = 90$$

90.300 coins consists of 1 rupee, 50 paise and 25 paise coins, their values being in the ratio of 10 : 4 : C. Find the number of coins of each type.

- A. 100, 80, 120
- B. 80, 90, 100
- C. 100, 100, 80
- D. 60, 80, 100

Option A

Value of rupee coins = 10 i.e. 10 coins. Value of 50 p coins = 4 i.e. 8 coins.
Value of 25 p coins = Rs. 3 i.e. 12 coins. \therefore Ratio of coins = 10 : 8 : 12 \Rightarrow 5 : 4 : 6. \therefore Number of rupee coins = $\frac{5}{15} \times 300 = 100$. Number of 50 P coins = $\frac{4}{15} \times 300 = 80$ and Number of 25 P coins = $\frac{6}{15} \times 300 = 120$

References Links

<https://www.hitbullseye.com/Ratio-and-Proportion.php>

<https://www.examsbook.com/ratio-and-proportion-questions-and-answers-aptitude-problems>