AILET

How to Solve Ratio and Proportion for CLAT 2020

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As we know in the revised syllabus for CLAT 2020 (UG), the questions in the Quantitative Techniques are Data Interpretation based but even then, to solve those DI questions faster and accurately, it is important for you to be well acquainted with the basic mathematical concepts like Percentage, Ratio and Proportion, Profit and loss, Simple Interest, Compound Interest, Mensuration etc.

In this post, we will be dealing with the concept of Ratio and Proportion that very evidently finds it use from everyday life to complex chemical compounds. Ratio and Proportion are not the same but related to each other.

This concept is more about common sense than about any complex formula or theory. So, let's start with it!

As a formal definition, a ratio is used to show a relationship between two numbers or a comparison between two items of the same type. The basic thing about understanding the concept of ratios is that those two things you are comparing must be of the same type or related.

In simple words, the ratio is just the number of times one quantity contains other. By the same type, we mean that they should be comparable. For instance, you cannot compare two humans with 5 apples. You have to compare humans with humans and apples with apples.

The ratio is often reduced to its simplest form and represented as a: b or a/b. Unlike in fractions, in ratios, 'a' is called antecedent and 'b' is called the consequent. Let us take an example,

Illustration 1: We want to find out about the gender of employees of a government department. If there are a total of 2000 employees and the ratio of male employees to the female employee is 5:3, you can find the no. of male employees and female employees. Let us see how:

Here 5 in the ratio represents male employees and 3 in the ratio represents female employees.

So, suppose there are 8 employees (5+3), then as per the ratio given, there are 5 males and 3 females. Therefore,

Males = 5/8 and females = 3/8

No. of male employees in office = (5/8)*2000 = 1250

No. of female employees in office = (3/8)*2000 = 750

The point worth noting in the example above is that firstly the quantities compared were of the same type i.e. employees and secondly that we convert the ratio in fractions and them solve them.

Although CLAT doesn't focus much upon the concept of Proportion it is no harm to know a little about it rather than risking even one mark by skipping it. So, when two ratios are equal, they are said to be in proportion. Hence the equivalence of two ratios is called proportion.

If a: b = c: d, then a, b, c, d are said to be in proportion. It is represented as a:b::c:d or a:b=c:d.

Illustration 2: If a car covers a distance of 30 km in 2 hours, will it be able to cover a distance of 90kms in 6 hours?

The first step here would be to find the ratio between the two distances.

The ratio between the two distances = 30: 90 = 1:3

Remember Speed here is constant. (Speed = Distance/ time)

We will now find the ratio between the time taken in covering both the distance

The ratio between the time taken = 2:6 = 1:3

Since, The ratio between the two distances = The ratio between the time taken

Therefore, they are in proportion.

Hence it can be said that it will be able to cover the distance of 90 kilometres in 3 hours at the same speed.

Now, because we want to find accurate and fast answers, it is always better to have a list of formula that will make it easier.

1. If x:y = m:n, then it means that x, y, m and n are in proportion and x*n =y*m
2. There is a concept of a constant of proportionality. Remember:

- If x is directly proportional to y, it implies that x = k * y where k is the constant of proportionality.
- If x is inversely proportional to y, it implies that x = k/y or it may be written as x*y = k where k is the constant of proportionality.

1. If the antecedent i.e. x and the consequent i.e. y of the ratio x:y is multiplied by the same number, it doesn't change the property of the ratio. For instance, 1:3 is multiplied by 8, it becomes 8:24 which is same as 1:3.
2. The concept of Componendo and Dividendo can be explained as:

If x:y = m:n i.e. x/y = m/n, then (x+y)/(x-y) = (m+)/(m-n)

1. The concept of Componendo and Dividendo can be explained as:

If we have two ratios x:y and m:n, then the Compounded ratio = (x*m) : (y*n)

Now that we are done with the list of formula and the basic concept of ratio proportion, then lets us look at some types of questions that may get asked from this portion.

Illustration 3: Two numbers are in the ratio 3:7 and the smaller number is 35 more than the one-fourth of the greater number. Find the numbers.

Here, the numbers are in the ratio 3:7. Let us assume the smaller number as 3x and a greater number as 7x. As per the question:

3x = 35 +(7x/4)

12x = 140+7x

5x = 140

x = 28

Therefore, smaller number is 3x = 3*28 = 84

And the greater number is 7x = 7* 28 = 196

Illustration 4: If one dozen notebooks cost Rs. 840, then at the same rate, how much will 17 notebooks cost?

Here, the concept of proportionality will apply.

One dozen = 12 items

Let the price of 17 notebooks be x

12 notebooks / Rs. 840 = 17 notebooks /x

Applying the formula,

If x:y = m:n, then it means than x, y, m and n are in proportion and x*n =y*m

12 *x = 840*17

x = (840*17)/12

=Rs. 1190

Illustration 5: If the mixed fruit juice contains Grape juice and apple juice in the ratio of 7:5. Now, 20 litres of apple juice is added in this mixture, and the final ratio is 5:7. Find the initial quantity of grape juice and apple juice in the mixture.

Here, Initial quantity of Grape juice = 7k

Final quantity of Grape juice = 7k

Initial quantity of apple juice = 5k

Final quantity of apple juice = 5k +20

Moreover, the final ratio is given as 5:7

Therefore, as per the question:

7k: 5k+20 = 5:7

Applying the formula,

If x:y = m:n, then it means than x, y, m and n are in proportion and x*n =y*m

7k* 7 = 5*(5k+20)

49k = 25k +100

24k = 100

k= 4.16 = 4(approx.)

Therefore, Initial quantity of Apple juice= 5k = 5*4 = 20 L

And, Initial quantity of grape juice= 7k = 7*4 = 28 L

These are just a few examples of how questions can be framed. To make sure that you score the 100% marks in those portion of Quantitative Techniques, try solving as many types of questions as possible! Keep Practicing

Read the theory on Simple and Compound Interest here.

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