**Ratio & Proportion**

**Ratio:**

Ratio is used to identify how many times a given number is in comparison to another. It is denoted as a:b. The numerator ‘a’ is called the ‘antededent’ and the denominator 'b' is called 'consequent'.

**Important Points:**

1. If we multiply or divide the numerator and denominator of a ratio by the same number, the ratio remains unchanged .

2. The ratio of two fractions can be expressed as a ratio of two integers. Thus the ratio:

a/b:c/d = ad/bc

**Proportion:**

When two ratios are equal, the four quantities composing them are said to be propotionals. Thus if a/b = c/d, then a,b,c,d are proportional. It is written as

a:b::c:d

or

a:b = c:d

**Fourth Proportional:**

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

**Third Proportional:**

a : b = c : d, then c is called the *third proportional* to a and b.

**Mean Proportional:**

*Mean proportional* between a and b is ab.

**Important Points:**

1. The terms a and d are called extremes while the terms b and c are called means.

2. If four quantities are in proportion, the product of extremes is equal to the product of means.

ad = bc

3. If three quantities a,b and c are in continued proportion, then

ac = b^2

4. If three quantities are proportional to the first is to the third is the duplicate ratio of the first to the second.

That is for a:b::b:c

a:c= a^2:b^2

5. If four quantities a,b,c and d from a proportion, many other proportions may be deduced these are

I Invertendo: if a/b = c/d, then b/a = d/c

II Alternando: If a/b = c/d, then a/c = b/d

III Componendo: If a/b = c/d, then (a+b)/b = (c+d)/d

IV Dividendo: If a/b = c/d, then (a-b)/b = (c-d)/d

V Componendo and Divinendo: If a/b = c/d, then (a+b)/(a-b) = (c+d)/(c-d)

Examples:

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| Example 1 | If = , find the value of |
| Solution | = = |

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| Example 2 | Find the greatest of 3 natural numbers which are in the ratio 3 : 2 : 5, if the sum of their squares is 1862 |
| Solution | If the numbers are 3x, 2x and 5x, then  So = 49 or x = 7  So the greatest number = 5x = 35 |