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RATIO AND PROPORTION SHORTCUTS

Hint 1:

a/b is the ratio of a to b . That is $a:b$

Hint 2:

When two ratios are equal, they are said to be in proportion.

Example:

If $a:b = c:d$, then a, b, c & d are proportion.

Hint 3:

Cross product rule in proportion:

Product of extremes = Product of means.

Example:

Let us consider the proportion $a:b = c:d$

Extremes = a & d , means = b & c

Then, as per the cross product rule, we have

$$ad = bc$$

Hint 4:

Inverse ratios:

$b:a$ is the inverse ratio of $a:b$ and vice versa.

That is, $a:b$ & $b:a$ are the two ratios inverse to each other.

Hint 5:

Verification of inverse ratios:

If two ratios are inverse to each other, then their product must be 1.

That is, $a:b$ & $b:a$ are two ratios inverse to each other.

Then, $(a:b) \times (b:a) = (a/b) \times (b/a) = ab/ab = 1$

Hint 6:

If the ratio of two quantities is given and we want to get the original quantities, we have to multiply both the terms of the ratio by some constant, say "x".

Example:

The ratio of earnings of two persons is 3:4.

Then,

the earning of the first person = $3x$

the earning of the second person = $4x$

Hint 7:

How to split the given quantity in the given ratio ?

It has been explained clearly in the following example.

Example:

The total strength of a school is 450 and the ratio of boys to girls is 3:2. Find the number of boys and girls.

From the ratio 3:2,

No. of boys = $3x$

No. of girls = $2x$

Total no. of students = 450

$$3x + 2x = 450 \quad \gg \gg \gg \gg \gg \quad 5x = 450 \quad \gg \gg \gg \gg \gg \quad x = 90$$

No. of boys = $3(90) = 270$

No. of girls = $2(90) = 180$

Hint 8:

If we want to compare any two ratios, first we have to express the given ratios as fractions. Then we have to make them to be like fractions. That is, we have to make the denominators of fractions to be same.

Example:

Compare 3:5 and 4:7

First, let us write the ratios 3:5 and 4:7 as fractions.

That is $\frac{3}{5}$ and $\frac{4}{7}$.

The above two fractions do not have the same denominators. Let us make them to be same.

For that, we have to find L.C.M of the denominators (5,7).

That is, $5 \times 7 = 35$. We have to make each denominator as 35.

Then the fractions will be $\frac{21}{35}$ and $\frac{20}{35}$.

Now compare the numerators 21 and 20.

21 is greater.

So the first fraction is greater.

Hence the first ratio 3:5 is greater than 4:7.

Hint 9:

If two ratios P:Q and Q:R are given and we want to find the ratio P:Q:R, we have to do the following steps.

First find the common term in the given two ratios P:Q and Q:R. That is Q.

In both the ratios try to get the same value for "Q".

After having done the above step, take the values corresponding to P, Q, R in the above ratios and form the ratio P:Q:R.

Example:

If P:Q = 2:3 and Q:R = 4:7, find the ratio P:Q:R.

In the above two ratios, we find “Q” in common.

The value corresponding to Q in the first ratio is 3 and in the second ratio is 4.

L.C.M of (3, 4) = 12.

So, if multiply the first ratio by 4 and second by 3,

we get P:Q = 8:12 and Q:R = 12:21

Now we have same value (12) for “Q” in both the ratios.

Now the values corresponding to P, Q & R are 8, 12 & 21.

Hence the ratio P:Q:R = 8:12:21

Hint 10:

If the ratio of speeds of two vehicles in the ratio a:b, then time taken ratio of the two vehicles would be b:a.

Example:

The ratio of speeds of two vehicles is 2:3. Then time taken ratio of the two vehicles to cover the same distance would be 3:2.

Hint 11:

If the ratio of speeds of two vehicles in the ratio a:b, then the distance covered ratio in the same amount of time would also be a:b.

Example:

The ratio of speeds of two vehicles is 2:3. Each vehicle is given one hour time. Then, the distance covered by the two vehicles would be in the ratio 2:3.

Hint 12:

If A is twice as good as B, then the work completed ratio of A and B in the same amount of time would be 2:1.

Example:

A is twice as good as B and each given 1 hour time. If A completes 2 unit of work in 1 hour, then B will complete 1 unit of work in one hour.

Hint 13:

If A is twice as good as B, then the time taken ratio of A and B to do the same work would be 1:2.

Example:

A is twice as good as B and each given the same amount of work to complete. If A takes 1 hour to complete the work, then B will take 2 hours to complete the same work.

Hint 14:

If “m” kg of one kind costing \$a per kg is mixed with “n” kg of another kind costing \$b per kg, then the price of the mixture would be \$ $(ma+nb)/(m+n)$ per kg.

Hint 15:

If one quantity increased or decreases in the ratio a:b,

then the new quantity is = “b” of the original quantity/a

More clearly, new quantity = (“b” X original quantity) / a

Example:

David weighs 56 kg. If he reduces his weight in the ratio 7:6, find his new weight.

New weight = $(6 \times 56) / 7 = 48$ kg.

Hence, David’s new weight = 48 kg.