

Percentages Basic Concepts

Let us look at a basic calculation.

Let $A = 30$ and $B = 40$.

By what percentage is B greater than A?

Of course all of you know this as $\left(\frac{B-A}{A}\right)100$.

Now, most of you should have come across certain percentage based questions, **especially in Data Interpretation**, where the question is not as simple as the above discussed one. And I believe in such situations you are not sure of what is the numerator and the denominator of the calculation.

So as I told you earlier, our agenda of this lesson is to **AVOID FORMULAE AND GET INTO REAL LIFE SITUATION BASED CALCULATIONS**

In the word **PERCENTAGE** PER means 'for every' and CENT means '100'.

So **PERCENTAGE** means 'for every 100'.

For example,

If a student secured 80 percent marks in an exam, we neither know his marks nor the maximum marks in the exam.

But **If the maximum marks are scaled to 100, the marks scored by this student will be 80.**(1)

Similarly **If the maximum marks are scaled to 1, the marks scored by this student will be 4/5.**(2)

Now, if you have to solve questions based on Percentages quickly, you have to get into the fractions.

Wait wait.....What do you mean by getting into fractions?

Now when we use the word percentage, we know that we are speaking relative to 100.

Instead if we speak relative to 1, our calculations can be made much faster.

So from now, in all our calculations we are never going to use 100.

For this you have to remember certain fractions and their corresponding percentages.

Here is the table that you must remember to speed up your calculations.

$$1. \frac{1}{2} = 50\%$$

$$2. \frac{1}{3} = 33\frac{1}{3}\%$$

$$3. \frac{1}{4} = 25\%$$

$$4. \frac{1}{5} = 20\%$$

$$5. \frac{1}{6} = 16\frac{2}{3}\%$$

$$6. \frac{1}{7} = 14\frac{2}{7}\%$$

$$7. \frac{1}{8} = 12\frac{1}{2}\%$$

$$8. \frac{1}{9} = 11\frac{1}{9}\%$$

$$9. \frac{1}{10} = 10\%$$

$$10. \frac{1}{11} = 9\frac{1}{11}\%$$

$$11. \frac{1}{12} = 8\frac{1}{3}\%$$

Let us see how these fractions will speed up our calculations.

Let's go back to our first example.

$$A = 30 \text{ and } B = 40$$

By what percentage is B greater than A ?

So from now we are going to calculate only the corresponding fraction of the required calculation.

Now, determining the numerator of any percentage based calculation is pretty easy.

Just remove the word percentage from the given question.

By what is B greater than A ?

Now it is very easy to answer this....Isn't it?

By what is B greater than A ?

10.

This will be the numerator.

So from now, whenever you see a percentage based question which is a bit confusing, **remove the word percentage** from the given question and try to answer it and that will always be the **numerator of the fraction** that you are looking at.

Let's look at the denominator.

When I say that height of X is greater than that of Y,

it is clear that I am using height of Y as a reference (or base) for the calculation.

Similarly when I question you **By what percentage is B greater than A ?**, it is clear that I am using A as the base for my question. Hence the denominator is A.

So the required calculation is $\frac{10}{30} = \frac{1}{3} = 33\frac{1}{3}\%$.

In case if you can't straight away give the percentage equivalent of the fraction obtained, then multiply it by 100 to get the corresponding percentage.

For exams like GMAT, GRE and SAT the above mentioned fractions would be sufficient to answer the question that they face in the exam.

Even if you find a fraction in the exam which is not discussed here, you can obtain it from the values discussed here.

For example,

if you need $1/15$, it is same as $2/30 = 6.66\%$ (since $1/30 = 3.33\%$)

if you need $1/16$, it is half of $1/8 = 6.25\%$ (since $1/8 = 12.5\%$)

if you need $1/33$, it is $1/3$ of $1/11 = 1/3(9.09\%) = 3.03\%$

In case if you can't get the exact percentages, at least try to give the approx value so that you can conclude the answer from the choices given.

Once you master these calculations, believe me, you will find absolute difference in the time taken by you to complete the quant part of the exam because these fraction based calculations are not confined only to Percentages but also to Profit and Loss, Time, Work and Distance, Averages etc;

So my sincere suggestion for all the aspirants is "TRY TO AVOID 100 IN ALL THE CALCULATIONS THAT YOU ENCOUNTER IN YOUR PRACTICE SESSIONS"

For exams like CAT, it is advised to get the fractions up to 1/30.

Now since we have learnt the basic percentage calculation (a bit different from what most of the books in this world say) let us look at one more basic concept.

Given that A is 25% more than B. By what percentage is B less than A?

Again, the common calculation is :

Assume B = 100.

Given A = 125.

So B is less than A by 25. So Nr = 25.

Since A is used as base, Dr = 125.

Corresponding fraction is $25/125 = 1/5 = 20\%$

But as discussed earlier, we have to avoid 100 (coming to that case avoid assumptions completely)

Given A is 1/4 more than B

$$\Rightarrow A = \frac{5}{4}B$$

$$\Rightarrow B = \frac{4}{5}A$$

$$\Rightarrow B \text{ is } \frac{1}{5} < A$$

Hence B is 20% less than A.

Let's look at one more example.

Given that A is $14\frac{2}{7}\%$ less than B. By what percentage is B greater than A ?

(assuming 100 is not advisable here. Instead you can assume any multiple of 7. Anyway let's keep away from assumptions)

Given A is $1/7 < B$.

$$\Rightarrow A = \frac{6}{7}B$$

$$\Rightarrow B = \frac{7}{6}A$$

$$\Rightarrow B \text{ is } \frac{1}{6} > A$$

Hence B is 16.66% or *Tex - Error*.

Let's look at one more example.

Given A is 6.66% more than B. By what percentage is B less than A ?

Given that A is 1/15 more than B.

$$\Rightarrow A = \frac{16}{15}B$$

$$\Rightarrow B = \frac{15}{16}A$$

$$\Rightarrow B \text{ is } \frac{1}{16} < A$$

Hence B is 6.25% < A.

So, once again I suggest you to master this calculation to save time, especially in the DI section.

Now let's look at a simple application of what we have learnt.

The number cars sold by a company in 1998 is 2354 and the average price per car sold is 4.26 lakhs. In the year 1999 the number of cars sold by the company increased by 20% compared to that of last year but the average price per car decreased by 15% compared to that of last year. By what percentage is the revenue of 1999 more/less than that of 1998?

$$\text{Revenue of 1998 i.e , } R_{1998} = (2354)(4.26)$$

$$\text{Revenue of 1999 i.e , } R_{1999} = 120\%(2354)85\%(4.26) = \frac{6}{5}(2354)\frac{17}{20}(4.26)$$

It is clear from the given question that our calculation is regarding R_{1999} and R_{1998} is used for comparison.

So let us calculate $\frac{R_{1999}}{R_{1998}}$

Hence Revenue of 1999 is 2% more than that of 1998.