

Percentages: how to calculate Percentages with examples

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Percentage means per hundred, wherever you see the word “percent” or symbol %, it means $1/100$. For example, 30% means 30 out of 100. Percentage is the useful way of making comparisons. Wherever, percent symbol (%) is attached to any known or unknown value, it is read as percent, and not the percentage.

In this article, we are going to cover the key concepts of Percentages along with the various types of questions, and tips and tricks. We have also added a few solved examples, which candidates will find beneficial in their exam preparation. Read the article thoroughly to clear all the doubts regarding the same.

What is the Percentage of a Number?

In mathematics calculations, a percentage is a numeral or ratio that can be defined as a fraction of 100. In other words, we can say that the percentage is specified as a given fraction or part in every hundred. This implies that it is a fraction with 100 as the denominator and is commonly symbolised by the symbol “%” symbol.

For example, if we have to estimate the percent of a number, then divide the number by total and multiply it by 100. In a live test, Savita scored 45% marks, which means that she scored 45 marks out of 100.

Learn about Percentages in this video

<iframe width="560" height="315" src="https://www.youtube.com/embed/tsFi_apYQuE" title="YouTube video player" frameborder="0" allow="accelerometer; autoplay; clipboard-write; encrypted-media; gyroscope; picture-in-picture" allowfullscreen?rel=0></iframe>

Percentage Formula

To hold a better command on percentage calculation we need to know all percentage formulas. The basic formula used to calculate the percentage is equivalent to the ratio of actual value to the complete value multiplied by 100. The formula of the percentages is expressed as:

$$\text{Percentage formula} = \left(\frac{\text{Actual value}}{\text{Total value}} \right) \times 100$$

$$\text{For Example: } \frac{2}{4} \times 100 = 0.5 \times 100 = 50\%$$

Percentage Difference Formula

The percentage difference can be understood as the change in the value of an amount over some time in terms of percentage. If there are two values and we need to determine the percentage difference between the given two values, then this can be calculated by the below steps:

Step 1: Compute the difference (i.e subtract one value from the other) skip any negative sign if obtained.

Step 2: Estimate the average of the two values (add the values, then divide by 2).

Step 3: Finally divide the difference by the average obtained.

Step 4: Transform the obtained answer to a percentage for the result to be in percentages.

$$\text{Percentage Difference Formula} = \left| \frac{\text{First Value} - \text{Second Value}}{\left(\frac{\text{First Value} + \text{Second Value}}{2} \right)} \right| \times 100\%$$

The modulus symbols represent absolute value so that any negative outcome becomes positive.

Learn about [Profit and Loss](#)

Percentage Increase and Decrease Formula

Two cases might appear while computing percentage difference namely:

Percentage increase.

Percentage decrease.

Let us learn how to calculate both through the formula:

The percentage increase is equivalent to subtracting the original number from the new number and dividing the obtained answer by the original number. Multiply the final answer by 100 for the answer to be in percentage.

$$\text{Percentage Increase} = \frac{\text{Rise in the Number}}{\text{Original Number}} \times 100\%$$

$$\text{Rise in the Value} = \text{New number} - \text{Original number}$$

Likewise, percentage decrease is comparable to subtracting the new number from the original numeral and dividing the obtained answer by the original number. Multiply the final answer by 100 for the answer to be in percentage.

$$\text{Percentage Decrease} = \frac{\text{Decrease in the Number}}{\text{Original Number}} \times 100\%$$

$$\text{Decrease in the Number} = \text{Original number} - \text{New number}$$

We should remember that when the new value/number is greater than the old number/value, it is a percentage increase, otherwise, it is a decreasing percentage.

Percentage Formula in terms of a Fraction

To transform a fraction into a percentage divide the top/numerator number by the bottom/denominator number and lastly multiply the result by 100%.

$$\frac{\text{Numerator Value}}{\text{Denominator Value}} \times 100\%$$

Percentage Change Formula

Sometimes when it is required to get the increase or decrease in any quantity as percentages, which is also directed to as percentage change is given by the formula:

Percentage Change= $\frac{\text{New value} - \text{Original value}}{\text{Original value}} \times 100$

How to Find Percentage?

To estimate the [percentage](#) of any value/ data/ number, we can apply the various formulas as discussed above as per the condition applied. Let us learn the basic method to find the percentage.

A% of a data = B

Here B is the necessary percentage.

If we wish to remove the % sign, then the formula is expressed as:

A/100 * given data = B

For example:

How to calculate 20% of 60.

Let 20% of 60 = Y

20/100 * 60 = Y

Y = 12

Similarly; 8% means 8 out of every 100, or in fraction we write 8/100.

In the same way, 50% can be composed as a fraction, 1/2, or a decimal, 0.5.

Percentage Table

Some common fraction and their percentages equivalents are given below.

Fraction	Percentage
1/1	100%
1/2	50%
1/3	33.33%
1/4	25%
1/5	20%
1/6	16.66%
1/7	14.28%
1/8	12.5%

1/8	12.5%
1/9	11.11%
1/10	10%
1/11	9.09%
1/12	8.33%

Once you've mastered Percentages concept, Also, learn more about [Partnership](#) concepts in depth!

How to Convert Fractions to Percentages?

A fraction can be represented by; $\frac{x}{y}$ and can be converted into percentage by the below formula:

$$\frac{x}{y} \times 100$$

Therefore by the formula, it is clear that we can convert fraction to percentage merely by multiplying the given fraction by 100.

Note:

To convert percentages into fraction, divide it by 100.

Example: $25\% = 25/100 = 1/4$

To convert a fraction into percentage, multiply in by 100.

Example: $1/5 = 1/5 \times 100 = 20\%$

Difference between Percentage and Percent

The words percentage and percent are nearly related to one another. The tradition for operating percent and percentage is as specified. The word percent (or the symbol %) accompanies a specific number, on the other hand, the word percentage is used without a number.

An example of Percent:

More than 65% of the country's population have been vaccinated with the first dose of Covid-19.

An example of Percentage:

A very large percentage of the world's population has been exposed to Covid-19 pandemic.

Important Definitions related to Percentages

Let us know some of the important definitions related to the percentage.

Percentage Entity	Definition
Cost Price	Cost price is the price at which a person purchases a product.
Selling Price	Selling price is the price at which a person sells a product.
Market Price	It is the price that is marked on an article or commodity. It is also known as list price or tag price. If there is no discount on the marked price, then the selling price is equal to marked price.
Markup	It is the amount by which cost price is increased to reach market price. Markup = market price – cost price
Discount	The reduction offered by a merchant on marked price is called discount.
Profit	When a person sells a product at a higher rate than the cost price, the difference of both amounts is called profit. Profit = Selling price – Cost price
Loss	When a person sells a product at a lower rate than the cost price, then the difference of both amounts is called loss. Loss = Cost Price – Selling Price
Percentage Points	It is the difference between two percentages. For example, if the Reserve Bank of India increases the rate of interest from 8% to 10%, we can say that an increase in the rate of interest is 2 percentage points, while the percentage increase in rate of $\{(10 - 8) / 8\} \times 100 = 25\%$.

Marks Percentage

Marks obtained by students in various exams during school and colleges are mostly out of 100. These marks are calculated in terms of percent. For example, consider if a student has scored X marks out of total marks. And, if we have to decide the percentage score; then we divide the scored mark from total marks and multiply the result by 100.

Tips and Tricks to solve Percentage based Questions Faster

Candidates can find different tips and tricks from below for solving the questions related to percentage.

Tip # 1: Candidates need to make sure that they know all the important formulas of percentage which are mentioned below.

- Profit % = profit x 100 / cost price
- Loss % = loss x 100 / cost price

- Markup % = (markup / cost price) x 100
- Discount % = (discount / market price) x 100

Tip # 2: Successive Percentage Change: We can use successive percentage change formulas to solve percentage related problems where the product of two quantities equal the third quantity. For example,

$$\Rightarrow \text{Length} \times \text{Breadth} = \text{Area}$$

$$\Rightarrow \text{Price} \times \text{Quantity purchased} = \text{Expenditure}$$

\Rightarrow If any quantity is increased by x%, then y% and later on z%, the overall or effective percentage increase is:

$$\Rightarrow [(100 + x) / 100] (100 + y) / 100 (100 + z / 100) - 1] \times 100$$

Also check [Pipe and Cistern](#) concepts here once you are through with Percentages concepts!

Percentage Solved Example for Competitive Exams

Question 1: 20 gram is what percentage of 1 kg?

Solution 1: Here, quantity 1 = 20 grams and quantity 2 = 1kg = 1000 grams

$$\Rightarrow \text{Hence, required percentage} = 20/1000 \times 100 = 2\%$$

Question 2: If the price of sugar is increased by 10%, then by how much percent consumption should be reduced so that the expenditure remains the same?

Solution 2: Let the price be Rs. x /kg Consumption be y kg

$$\Rightarrow \text{Hence, expenditure} = \text{price} \times \text{consumption} \Rightarrow \text{Expenditure} = xy$$

$$\Rightarrow \text{Price of sugar is increased by 10\% Hence, new price of sugar} = 1.1x \text{ per kg}$$

$$\Rightarrow \text{Let new consumption be } z \text{ kg}$$

$$\Rightarrow \text{Hence, new expenditure} = (1.1x) \times z \text{ Now, new expenditure} = \text{old expenditure}$$

$$\Rightarrow (1.1x) \times z = x \times y \Rightarrow z = y/1.1$$

$$\text{Reduction in consumption} = (y - z) = y - (y/1.1) = y/11$$

$$\therefore \text{Percentage reduction in consumption} = [(y/11)/y] \times 100 = 100/11 = 9.09\%$$

Question 3: The population of a town 2 years ago was 245000. It increased by 15% in the first year and then increased by 20% in the second year. What is the current population of the town?

Solution 3: The population of a town 2 years ago was 245000 It increased by 15% in the first year

$$\therefore \text{The population after first year will be} = (115 / 100) \times 245000 = 281750$$

$$\Rightarrow \text{The population then increased by 20\% in the second year.}$$

∴ The population after second year will be = $(120 / 100) \times 281750 = 338100$

Question 4: An electric bulb was bought at Rs. 4100. Its value depreciates at the rate of 7% per annum. Its value after one year will be:

Solution: Actual price of the electric bulb = Rs. 4100

⇒ Depreciation rate = 7%

∴ Value after 1 year = $4100 - 7\% \text{ of } 4100 = 4100 - 4100 \times (7/100) = \text{Rs. } 3813$

Question 5: If A's income is 40% more than the income of B, then what percentage of B's income is less than income of A?

Solution: Let the income of B be 100

∴ Income of A = 140

⇒ B's income is less than income of A by $(140 - 100) = 40$

⇒ Required percentage = $(40 / 140) \times 100 = 200 / 7 = 28 \frac{4}{7} \%$

Question 6: If A is 40% less than B, then B is how much percentage more than A?

Solution: Given, A is 40% less than B Let B be 100

⇒ $A = B - 40\% \text{ of } B = 100 - 40\% \text{ of } 100 = 100 - 40 = 60$

∴ Required % = $\{(100 - 60)/60\} \times 100 = (40/60) \times 100 = 66.66\%$

⇒ When you've finished with Percentage, you can read about [Number Series](#) concepts in depth here!

Exams where Percentages is Part of Syllabus

Questions based on percentage come up often in various prestigious government exams some of them are as follows.

- [SBI PO](#), [SBI Clerk](#), [IBPS PO](#), [IBPS Clerk](#)
- [SSC CGL](#), [SSC CHSL](#), [SSC MTS](#)
- [LIC AAO](#), [LIC ADO](#)
- [RRB NTPC](#), [RRB ALP](#)
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We hope you found this article regarding Percentage was informative and helpful, and please do not hesitate to contact us for any doubts or queries regarding the same. You can also download the [Testbook App](#), which is absolutely free and start preparing for any government competitive examination by taking the mock tests before the examination to boost your preparation.

If you are checking Percentage article, also check the related maths articles in the table below:	
Rhombus	Circles
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Interest	Sets

Percentage FAQs

Q.1 What is Percentage?

Ans.1 Percentage means per hundred, wherever you see the word “percent” or symbol %, it means 1/100.

Q.2 How do you calculate percentages?

Ans.2 The percentage can be computed by dividing the given value by the whole value and then multiplying the outcome by 100.

Q.3 What is the easiest way to find a percentage of a number?

Ans.3 The easiest way to find a percentage of a number is to multiply the given number in question by the decimal form of the percent. For example, the decimal form of 20 percent is 0.2.

Q.4 What is the percent of a number?

Ans.4 In mathematical calculations, a percentage is a number or ratio that represents a fraction of 100. For example, 42% is equivalent to the decimal 0.42, or the fraction 42/100.

Q.5 What is .04 as a percent?

Ans.5 .04 as a percent is equivalent to: $0.04=4/100=4\%$.

Q.6 What is the percent of 20 out of 100?

Ans.6 $20/100=0.2$

Therefore, 20 is 20 % of 100.

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