

# Percentage Tricks with Questions (PDF Version)

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## Meaning and Examples

To understand the meaning of a percentage you have to go through the meaning of number , secondly the ratio and there after the fraction and then we learn about percentage.



## Number

A **number** is a symbolic representation of each unit set in a particular priority

## Ratio and Fraction

To compare those number with each other we use ratio which can also be represented in the form of fraction. Ratio and fraction are co-related to each other in a way. **In a fraction** the upper value is called as a numerator and the lower value is called as a denominator. The fraction is any value which does not contains zero in the denominator.

## Percentage

Till now we have known about number ,ratio and the fraction and now we are comes to the part of percentage.

*Percentage word which is a combination of a word " **per cent** " that means for every hundred.*

*The number, which is in a fraction form whose denominator is "100" is called as a percentage and the numerator of the same number is called as a rate per cent .*

## Examples :

1. A student get 50% marks in an examination if he obtained 250, then the total marks is ?

Sol:

This implies that 50 ' for every hundred '.then total marks is equals to  $250/50 \times 100 = 500$

it means 50 marks for every 100.then total marks is equals to 500 and to get that while solving percentage ,it will be easy for you some time to use fraction like  $250/1 \times 2 = 500$ .

**2. A student get 33.33% marks in an examination if the total marks is 999, then find his marks ?**

**Sol:**

$$1/3 \times 999 = 333.$$

**3. A man gave loan at 40% rate of interest.**

**Sol:**

it implies

(i) he will get Rs. 40 on/for every Rs. 100 as a interest.

or

(ii) he will get  $2/5$  of the principal as a interest.

or

(iii) he will get  $40/100$  for every 100.

**4. a) A seller get 12% profit on a product. ) A seller get 12% profit on a product which is cost Rs. 225 to him/her.**

**Sol:**

(a)

A seller get 12% profit implies for every 100% or  $3/25$  on/for every 100.

(b)

Now If a seller get 12% profit on Rs. 225 that means he get Rs. =  $12/100 \times 225$  or  $3/25 \times 225$

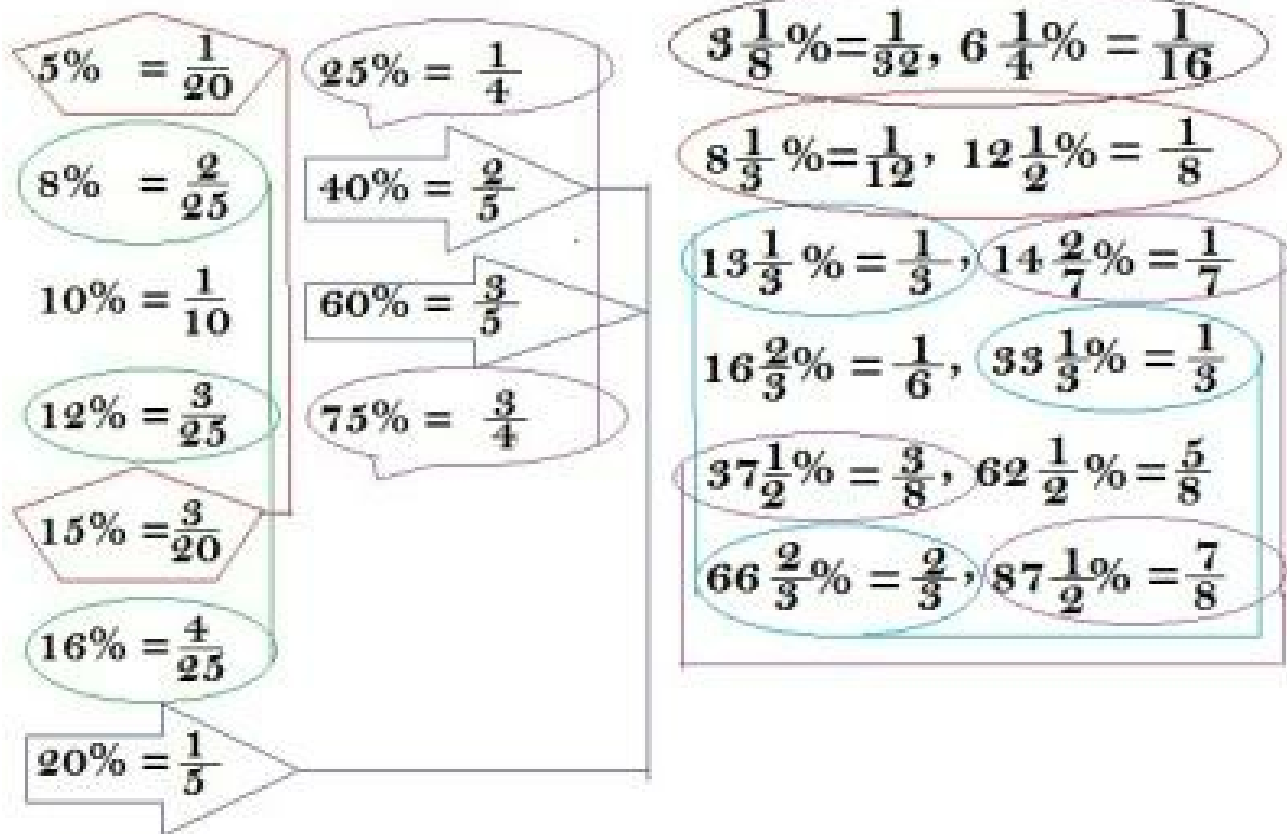
**'Tips and Tricks'**

Now we have two option/method/way to solve this question but we need to consider the which saves our time , so we follow

he get Rs. =  $3/25 \times 225$  (fraction is more helpful in this case)

$$= \text{Rs.}27$$

To calculate it much faster, do remember at least table upto 30 and some important most used fractions:



5.(a) Find 13.33% of 300 ? (b) What percent is equivalent to  $\frac{1}{7}$  or express  $\frac{1}{7}$  as rate per cent ?

Sol:

(a)  $\frac{1}{3} \times 300 = 100$  (b)  $\frac{1}{7} \times 100 = 14\frac{2}{7}\%$

6. The income of a person has gone decrease from 1000 to 950. The percent value of income that has gone decreased is ?

Sol:

decrease in income =  $1000 - 950 = 50$   
 Percentage Decrease =  $\frac{50}{1000} \times 100 = 5\%$

7. In a election between two candidates ( Ram and Sham ), the one candidate (Ram) who gets 40% votes is rejected by a majority of 360 votes. Find the total no. of votes polled ?

Sol:

$(60\% - 40\% = ) 20\% \equiv 360$   
 so ,  $100\% \equiv 360/20 \times 100 = 1800$ .

**8. If 2 litres of water is evaporated on boiling from 8 litres of salt solution containing 5% salt, find the percentage of salt in the remaining solution.**

**Sol:**

As we know that if we mix salt or sugar in a water and then boil it water will evaporate but salt or sugar will not that's why the quantity of salt or sugar in an original mixture or solution = the quantity of salt or sugar in the remaining mixture or solution

so  $5\%$  of  $8 = x\%$  of  $6$

$x = 5 \times 8 / 6$

$x = 6\frac{2}{3}\%$

**9. One type of mixture contains 40% of alcohol and the other contains 30% of alcohol with respect to it's water. A cane is filled with 8 parts of the first mixture and 6 parts of the second mixture. Find the percentage of alcohol in the new mixture ?**

**Sol:**

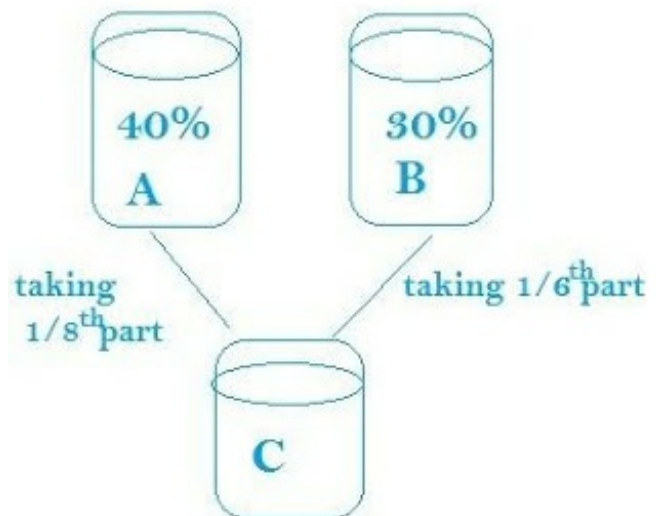
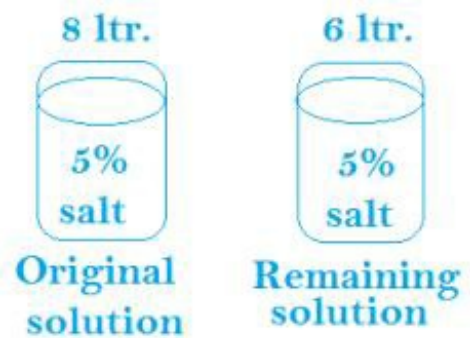
Now to understand this type of problem , first of all you need to understand the fraction. A number which is a unit set in particular priority , so to divide a unit into any number of equal parts, one or more of these part is known as a fraction of the unit. the lower number indicates the equal parts and the upper number indicates the number of part taken to form the fraction.

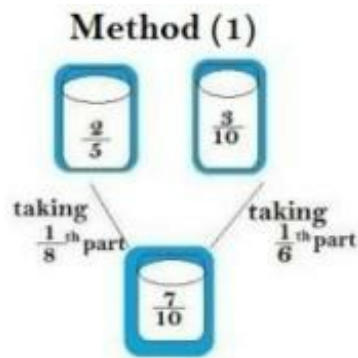


$$60\% - 40\% = 20\%$$

$$20\% = 360$$

$$100\% \equiv \frac{360}{20} \times 100 = 1800$$





$$\frac{\frac{2}{5} + \frac{3}{10}}{\frac{1}{8} + \frac{1}{6}} \times 100$$

$$\frac{\frac{2}{5} \times \frac{8}{1} + \frac{3}{10} \times \frac{6}{1}}{14} \times 100$$

$$\frac{\frac{16}{5} + \frac{9}{5}}{14} \times 100$$

$$\frac{25}{5} \times \frac{1}{14} \times 100$$

$$= \frac{5}{1} \times \frac{50}{7}$$

$$= \frac{250}{7} \text{ or } 35 \frac{5}{7}$$

**Method (2)**



$$\frac{30-x}{x-40} = \frac{8}{6} \quad \boxed{\frac{8}{6} \text{ or } \frac{4}{3}}$$

$$90 - 3x = 4x - 160$$

$$x = \frac{250}{7}; \quad x = 35 \frac{5}{7}$$

**Quantity of alcohol in the new mixture**  
**Quantity of the new mixture**  $\times 100$

**8 parts of 40% alcohol + 6 parts of of 30% alcohol**  
**( 8 parts + 6 parts ) of the mixture**  $\times 100$

$$\frac{8 \times \frac{40}{100} + 6 \times \frac{30}{100}}{14} \times 100 = \frac{\frac{16}{5} + \frac{9}{5}}{14} \times 100$$

$$= \frac{25}{14} \times 100 = \frac{25}{\frac{14}{1}} \times 100 = \frac{5}{1} \times \frac{1}{14} \times 100$$

$$= \frac{5}{7} \times 50 = \frac{250}{7} = 35 \frac{5}{7}$$

10. Due to fall in manpower, the production decreased by 25%. By what per cent

**should the working hour be increased to restore the original production ?**

**Sol:**

$$\text{Production} = \text{Manpower} \times \text{Working Hour}$$

$$\text{Decrease in Production} = \text{Decrease in Manpower}$$

Let Manpower = 100 units and Working Hour = 100 units, Suppose working hours increase by x%.

$$\text{Then, } (100-25)(100 + x) = 100 \times 100$$

$$100 + x = 400/3$$

$$x = 100/3 ; x = 33\frac{1}{3}\%$$

**11. What rate per cent is 6 paise of Rs. 1?**

**Sol:**

$$\text{Rs. 1} = 100 \text{ paise}$$

$$x \times 100 / 100 = 6$$

$$x = 6 \times 100 / 100$$

$$x = 6\%$$

**12. The population of the town is 13,800 which was increased by 15% then find the population of the men . If the ratio of the men and women were 2:1?**

**Sol:**

$$13,800 / 115 \times 100 = 12,000$$

$$2/3 \times 12,000 = 8,000$$

**13. If the price of a commodity be raised by 20%, find by how much per cent must a householder reduce his consumption of that commodity so as not to increase his expenditure?**

**Sol:**

**14. Two numbers are 20% and 40% respectively more than a third number.**

a) Find what percent is the first number of second ?

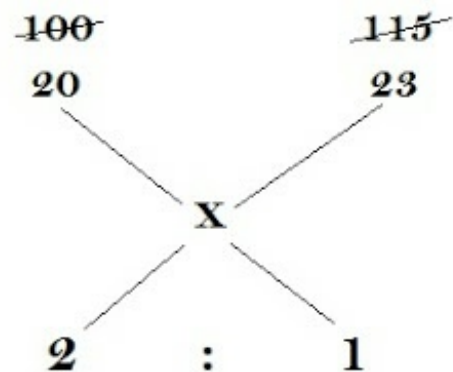
b) Find what percent less than is the first of second ?

c) Find what percent more than is the second of first ?

**Sol:**

Let there is a third number 100.so,

$$\text{First} = 120 \text{ and Second} = 140$$



$$\frac{23 - x}{x - 20} = \frac{2}{1}$$

$$23 - x = 2x - 40$$

$$\frac{63}{3} = x ; x = 21$$

a) First of Second =  $120/140 \times 100 = 600/7$  or  $85\frac{3}{7}\%$

b) Difference =  $140 - 120 = 20$

First of Second =  $20/140 \times 100 = 100/7$  or  $14\frac{2}{7}\%$

c) Difference =  $140 - 120 = 20$

Second of First =  $20/120 \times 100 = 50/3$  or  $16\frac{2}{3}$

**15. The salary of a worker is first increased by 10% and thereafter it was reduced by 10%. What was the change in his salary ?**

**Sol:**

Here what you need to find is (i) whether increase/ decrease (ii) how much percent Increase / decrease. Now we need to check increase/decrease

10% of 100 = +10 (increase) , here plus is the sign of increase

10% of 110 = -11 (decrease) , here minus is the sign of decrease

decrease% =  $-11+10 = -1$  (because the outcome is negative so it is decrease )

**Quicker Method:**

Theorem : If the value of a number is first increased by x% and later decreased by x%, the net change is always a decrease which is equal to x% of x or  $x^2/100$ .

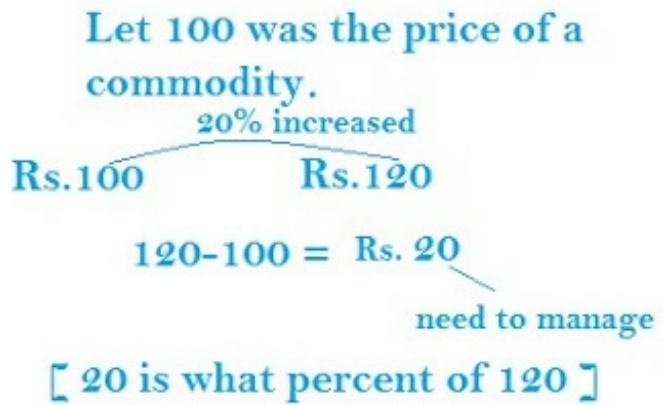
decrease % =  $(x^2/100) = 1\%$

**16. If the population of a town is increased by 15% in the first year and is decrease by 15% in the next year, what effect can be seen in the population of that town ?**

**Sol:**

$$\begin{array}{cc}
 100 & 115 \\
 \swarrow \text{(increased)} & \searrow \text{(decreased)} \\
 +15 & -17.25 \\
 \\ 
 & +15 - 17.25 = 2.25 \\
 \boxed{\text{increased}\% = 2.25} & 
 \end{array}$$

$15 \times \frac{15}{100} = 17.25$



$$\frac{20}{120} \times 100 = 16\frac{2}{3}\%$$

100		110
$\frac{10 \times 100}{100} = 10$		$\frac{10 \times 110}{100} = 11$
+10		-11
<b>+10 - 11 = -1</b>		
<b>decrease% = -1</b>		



**Quicker Method:**

$$\text{decrease \%} = x^2/100 = 1\%$$

$$\text{decrease\%} = (15)^2/100 = 225/100 = 2.25$$

**17. A shopkeeper marks the price of his goods 12% higher than its original price. After that , he allows a discount of 12%. What is his percentage profit or loss ?**

**Sol:**

**Quicker Method :**

$$(12)^2/100 = 144/100 = 1.44$$

**18. In an examination , a candidate must get 80% marks to pass. If a candidate who gets 210 marks fails by 50 marks, find the maximum marks.**

**Sol:**

**19. The number of seats in a cinema hall is increased by 25%. The price on a ticket is also increased by 10%. What is the effect on the revenue collected ?**

**Sol:**

<b>100</b>	<b>112</b>
	$\frac{12 \times 112}{100} = 13.44$
<b>+12</b>	<b>-13.44</b>
<b>+12 - 13.44 = -1.44</b>	
<b>decrease% = -1.44</b>	

100%	80%
?	Let x
	$x - 210 = 50$
	$x = 260$
$\frac{260}{80} \times 100$	
<b>= 325</b>	



Revenue collection = No. of Seats  $\times$  Ticket Price

Let Seats and Price was before = 100 so,

$$\text{Revenue} = 100 \times 100 = 10,000$$

[Previous Income/Revenue]

$$\begin{array}{l} \text{No of Seats} = 100 \xrightarrow{25\% \text{ increases}} 125 \\ \text{Ticket Price} = 100 \xrightarrow{10\% \text{ increases}} 110 \end{array}$$

$$\begin{array}{l} = 100 \times 100 = 10,000 \\ = 125 \times 110 = 13,750 \end{array} \quad \left. \vphantom{\begin{array}{l} = 100 \times 100 \\ = 125 \times 110 \end{array}} \right\} 3,750$$

$$\frac{3,750 \times 100}{10,000} = 37.5$$

**20. A candidate who gets 30% of the marks in a test fails by 50 marks. Another candidate who get 320 marks fails by 30 marks. Find the maximum marks ?**

**Sol:**

$$320 + 30 = x + 50$$

$$x = 300$$

$$300/30 \times 100$$

$$x = 1000$$

**21. A candidate scores 25% and fails by 30 marks, while another candidate who scores 50% marks, gets 20 marks more than the minimum required marks to pass the examination. Find the maximum marks for the examination?**

**Sol:**

$$25\% + 30 = \text{passing marks}$$

$$50\% - 20 = \text{passing marks}$$

$$25x + 30 = 50x - 20$$

$$x = 2$$

$$100x = 100 \times 2 = 200$$

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