

In mathematics, a **percentage** is a number or ratio that can be expressed as a fraction of 100, which means, a part per hundred. The word per cent means per 100. It is represented by the symbol “%”. Percentages have no dimension, hence are dimensionless numbers. If we say, 50% of a number, then it means 50 per cent of its whole.

Percentages can also be represented in decimal or fraction form, such as 0.6%, 0.25%, etc. In academics, the marks obtained in any subject are calculated in terms of percentage. Like, Ram has got 78% of marks in his final exam. So, this percentage is calculated on account of total marks obtained by Ram in all subjects to the total marks.

### Percentage Formula

To determine the percentage, we have to divide the numerator by denominator and then multiply the resultant to 100.

Percentage formula =  $(\text{Numerator}/\text{Denominator}) \times 100$

Example:  $2/5 \times 100 = 0.4 \times 100 = 40$  per cent

### How to calculate percentage of a number?

To calculate the percentage of a number, we need to use a different formula such as:

$P\% \text{ of Number} = X$

where X is the required percentage.

If we remove the % sign, then we need to express the above formulas as;

$P/100 * \text{Number} = X$

#### Example: Calculate 10% of 80.

Let 10% of 80 = X

$10/100 * 80 = X$

$X = 8$

Directions for questions from 1 to 23. Select the correct alternative from the given choices.

1. 67.5% is equal to \_\_\_\_.

- a.  $27/40$
- b.  $5/8$
- c.  $11/20$
- d.  $7/8$
- e.  $17/20$

2.  $9/16$  is equal to \_\_\_\_.

- a. 56.25%
- b. 60.75%
- c. 64.25%
- d. 68.75%
- e. None of these

3. 64% of which number is equal to 432?

- a. 575
- b. 625
- c. 675
- d. 725
- e. None of these

4. If 45% of N is equal to 65% of 720, then what is the value of N?

- a. 960
- b. 1040
- c. 1200
- d. 1240
- e. None of these

5. If 30% of  $x$  is equal to 20% of 420, then find  $x$ .

- a. 280
- b. 140
- c. 840
- d. 320
- e. None of these

6. Two students Sharan and Karan took a test. Sharan got 65% of the maximum marks in the test and Karan got 55% of the maximum marks of the test. The difference between the marks obtained by Sharna and Karan is 48. What are the maximum marks of the test?

- a. 360
- b. 400
- c. 440
- d. 480
- e. None of these

7. Ananya's monthly income was increased by 15% and became Rs. 7406. What was her monthly income before the increase?

- a. Rs. 6840
- b. Rs. 6640
- c. Rs. 6440
- d. Rs. 6240
- e. None of these

8. What percentage of 180 is 54?

- a. 70%
- b.  $333\frac{1}{3}\%$
- c. 30%
- d.  $33\frac{1}{3}\%$
- e. None of these

9. What percentage of 54 is 180?

- a. 70%
- b.  $333\frac{1}{3}\%$
- c. 30%
- d.  $33\frac{1}{3}\%$
- e. None of these

10. If Arun's monthly salary is 25% more than the monthly salary of Bhupathi, then by what percentage is the monthly salary of Bhupathi less than that of Arun?

- a. 10%
- b. 12%
- c. 15%
- d. 20%
- e. None of these

11. The price of rice is increased by 20%. By what percentage should the consumption be reduced so that the expenditure on the rice remains the same?

- a.  $16\frac{2}{3}\%$
- b. 20%
- c.  $66\frac{2}{3}\%$
- d. 25%
- e. None of these

12. The price of petrol is first increased by 40%, then it is decreased by 20%. The latest price of a litre of petrol is Rs. 56. Then what was the original price of the petrol per litre?

- a. Rs. 48
- b. Rs. 62
- c. Rs. 55
- d. Rs. 50
- e. None of these

13. Sagar donates 14% of his monthly income to charity. This month, he gave Rs. 1624 to charity which is 80% of what he donates every month. What is the monthly income of Sagar?

- a. Rs. 12,500
- b. Rs. 14,500
- c. Rs. 16,500
- d. Rs. 18,500
- e. None of these

14. In an exam, Gopi got 30% of maximum marks and failed and failed by 35 marks. Bhaskar got 50% of the maximum marks and got 25 marks more than the pass marks. Find the maximum marks.

- a. 350
- b. 400
- c. 300
- d. 500
- e. None of these

15. The ratio of the number of male employees and female employees in a company is 5:2. If 60% of the male employees and 25% of the female employees are post graduates, then what percentage of the employees are post graduates?

- a. 35%
- b. 40%
- c. 50%
- d. 85%
- e. None of these

16. X's expenditure is 25% more than Y's expenditure whereas Y's expenditure is 40% less than Z's expenditure. By what percentage is X's expenditure less than Z's expenditure?

- a. 20%
- b. 25%
- c. 30%
- d. 35%
- e. None of these

17. Akhil spends 80% of his income. If his income is increased by 20% and his expenditure is increased by 10%, then what will be the percentage increase in his savings?

- a. 15%
- b. 30%
- c. 45%
- d. 60%
- e. None of these

18. The price of an article is increased by 12%, 20% and 25% successively. What is the effective percentage increase in the price of the article?

- a. 64%
- b. 68%
- c. 72%
- d. 76%
- e. None of these

19. The price of an article is increased by 15% and 20% successively and then decreased by 25%. What is the effective percentage change in the price?

- a. 3.5% increase
- b. 2.5% increase
- c. 4.5% increase
- d. 10% increase
- e. None of these

20. When the price of an article is decreased by 40%, its sales increase by 50%. What is the effect on the revenue of the article?

- a. 10% increase
- b. 10% decrease
- c. 2% decrease
- d. 2% increase
- e. None of these

21. The length and the breadth of a rectangle are increased by 15% and 20% respectively. What is the percentage increase in the area of the rectangle?

- a. 38%
- b. 42%
- c. 46%
- d. 50%
- e. None of these

22. Mr. Akhil spends 20% of his income on house rent, 28% on food, 11% on clothes, 15% on education, 5% on travel, 8% on medicines and saves Rs. 1820. What is the total expenditure on education and medicine?

- a. Rs. 5460
- b. Rs. 2240
- c. Rs. 4030
- d. Rs. 3220
- e. None of these

23. Sravanti spends 20% on her income on house rent, 10% of the remaining on travel, 30% of the remaining on clothes,  $14\frac{2}{7}\%$  of the remaining on education, 50% of the remaining on food,  $33\frac{1}{3}\%$  of the remaining on medicines and saves remaining amount of Rs. 2304. What is the expenditure on education?

- a. Rs. 1152
- b. Rs. 6912
- c. Rs. 4535
- d. Rs. 1048
- e. None of these

**ADDITIONAL QUESTIONS FOR PRACTICE**

**Directions for questions from 1 to 5. Select the correct alternative from the given choices.**

1. The population of a country in 1991 was 25 crores and in 2001, it was 12% more than what it was in 1991. While the population in 2011 was 15% more than what it was in 2001. What was the population of the country in 2011?

- a. 32.2 crores
- b. 34.6 crores
- c. 36.6 crores
- d. 38.4 crores
- e. None of these

2. In a colony of 800 members, 55% are females. Of the males, 35% are employed while 25% of the females are employed. What percentage of the total number of members of the colony are employed?

- a. 29.5%
- b. 34.5%
- c. 39.5%
- d. 44.5%
- e. None of these

3. In an election, three candidates A,B and C contested. Of the votes polled, A got 42%, B got 28% of the votes polled and C got the rest. A got 3096 more votes than C. How many votes were polled in total?

- a. 21,600
- b. 22,900
- c. 24,200
- d. 25,800
- e. None of these



4. Anil invested 10% less than Bala and Bala invested 10% more than Charan. If the some total of their investments is Rs. 12,360, then how much amount did Charan invest?

- a. Rs. 4020
- b. Rs. 4000
- c. Rs. 4200
- d. Rs. 4420
- e. None of these

5. In city XYZ of population 12 lakhs, 70% of the population is aged above 18 years and of this 20% is above 60 years. Find the number of people aged above 18 years but aged 60 years and below.

- a. 6 lakhs
- b. 6.72 lakhs.
- c. 6.96 lakhs
- d. 7.02 lakhs
- e. None of these