# Percentage

By Rahul Agrahari

# Percentage Formula

- To determine the percentage, we have to divide the value by the total value and then multiply the resultant to 100.
- Percentage formula = (Value/Total value)×100

- Example: 2/5 × 100 = 0.4 × 100 = 40 %

# How to calculate the percentage of a number?

- To calculate the percentage of a number, we need to use a different formula such as:
- P% 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 * Number = X

➢ **Example: Calculate 10% of 80.**

- Let 10% of 80 = X
- 10/100 * 80 = X
- X = 8

# Percentage Increase and Decrease

- The percentage increase is equal to the subtraction of original number from a new number, divided by the original number and multiplied by 100.
- **% increase = [(New number – Original number)/Original number] x 100**
- where,
- increase in number = New number – original number
- Similarly, percentage decrease is equal to subtraction of new number from original number, divided by original number and multiplied by 100.
- **% decrease = [(Original number – New number)/Original number] x 100**
- Where decrease in number = Original number – New number
- So basically if the answer is negative then there is percentage decrease.

# Percentage Difference Formula

- The percentage difference is:
  The **difference** between two values divided by the **average** of the two values. Shown as a **percentage**.
- As if 2 numbers are given as X and Y. Then percentage difference can be calculated as

  $$=[(X-Y)/(\{X+Y\}/2)]*100$$

# Example

- Juice costs $4 in one shop and $6 in another shop, what is the percentage difference?

# Example

- Let a bag contain 2 kg of apples and 3kg of grapes. Find the ratio of quantities present, and percentage occupied by each.

# Solution

- The number of apples and grapes in a bag can be compared in terms of their ratio, i.e. **2:3**.
- The actual interpretation of percentages can be understood by the following way:
- The same quantity can be represented in terms of percentage occupied, which is given as:
- Total quantity present = 5 kg
- Ratio of apples (in terms of total quantity) = 2/5
- = (2/5)×(100/100)
- From the definition of percentage, it is the ratio that is expressed per hundred,
- 1/100=1%
- Thus, Percentage of Apples = (2/5)×100=40
- Percentage of Grapes = (3/5)×100=60

# Percentage Chart

| Fractions | Percentage |
|---|---|
| 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% |
| 1/9 | 11.11% |
| 1/10 | 10% |
| 1/11 | 9.09% |
| 1/12 | 8.33% |
| 1/13 | 7.69% |
| 1/14 | 7.14% |
| 1/15 | 6.66% |

# Converting Fractions to Percentage

- A fraction can be represented by ab.
- Multiplying and dividing the fraction by 100, we have
- a/b×100/100
- =(a/b×100)1/100 ……(i)
- From the definition of percentage, we have =1/100 = 1%
- Thus equation (i) can be written as:
- =a/b×100%
- Thus fraction can be converted to percentage simply by multiplying the given fraction by 100.

# Percentage Tricks

- To calculate the percentage, we can use the given below tricks.
- x % of y = y % of x
- Example- Prove that 10% of 30 is equal to 30% of 10.
- Solution- 10% of 30 = 3
- 30% of 10 = 3
- Therefore they are equal i.e. x % of y = y % of x holds true.

# SSC CHSL

- Suman has a monthly salary of $1200. She spends $280 per month on food. What percent of her monthly salary does she save?

# Solution

- Suman's monthly salary = $1200
- Savings of Suman = $(1200 – 280) = $ 920
- Fraction of salary she saves = 920/1200
- Percentage of salary she saves
  = (920/1200)×100
  =76.66%

# Some quicker methods:

- If a number is r % more than the second number, the second number will be $(\frac{r}{100+r} * 100)$ % less than the first number, e.g. If A's income is r % more than B's income, B's income is $(\frac{r}{100+r} * 100)$ % less than A's income.
- If a number is r % less than the second number, the second number will be $(\frac{r}{100-r} * 100)$ % more than the first number.
- If a value is increased by x % and later decreased by x %, net change in the value is always a decrease which is equal to x % of x or $\frac{x^2}{100}$.

# Some quicker methods:

- If two values are respectively x% and y% more than a third value, the first value is $\left(\frac{100+x}{100+y} * 100\right)\%$ of the second value. And, the second value is $\left(\frac{100+y}{100+x} * 100\right)\%$ of the first value.
- If two values are respectively x% and y% less than a third value, the first value is $\left(\frac{100-x}{100-y} * 100\right)\%$ of the second value. And, the second value is $\left(\frac{100-y}{100-x} * 100\right)\%$ of the first value.

# Some quicker methods:

- If the price of a commodity increases by x %, the reduction in consumption so as not to increase the expenditure is given by;

$$= \left(\frac{x}{100 + x} * 100\right) \%$$

- If the price of a commodity decreases by x %, the increase in consumption so as not to decrease the expenditure is given by;

$$= \left(\frac{x}{100 - x} * 100\right) \%$$

# TCS

- ✓ If the height of Ramesh is less by 20% than Suresh, the height of Suresh will be greater than that of Ramesh by how many percent?
- 25%
- 30%
- 32%
- 28%

# RRB JE

- Ram spends 70% of his salary and deposits 15 % of his salary in the bank. If he is left with Rs. 1500, what is his monthly salary?

a) Rs.9000
b) Rs.9500
c) Rs.10000
d) Rs.10500

# UPSC

- If A's income is 12 % more than B's income, B's income is how much less than A's income?

a) 9.7%
b) 10.7%
c) 11.7 %
d) 12.7%

# GATE 2007

- If the price of sugar increases by 10%, by what percentage a housewife should reduce the consumption of sugar so that expense is not increased?

a) 5.5%
b) 7.1%
c) 9.1%
d) 10%

# UPSC

- The price of chair , Table and stool are in the ratio 5:3:2. The price of chair is increased by 20%, the price of table is increased by 33.33% and the price of stool is increased by 10%. The new price of these article is how much percent increased or decreased from present price.

# GATE 1999

- A men spend 20% of his salary on house rent. Rest of 10% on food and rest 5.55% on travelling allowance. He saves Rs 20400. Find his Salary.

# UPPSC AE

- If the ratio of income: Expenditure = 5:3. If his income is increased by 20% and his expenditure is increased by 10% then the saving will be increased or decreased by what percent.

# CAT

- Each edge of a cube is increased by 20%. What is the percentage increase in the volume of a cube?

# Solution

- Let edge of a cube is x unit. Its volume = x^3 units ^3.
- New edge =x+20 % of x = 6x/5 units.
- New volume of the cube =(6x/5)^3 = 216x^3/125 units ^3
- Increase in volume =216x^3/125. - x^3. = 91x^3/125 units ^3
- Percentage increase in the volume of a cube=(91x^3/125)×100/x^3
- = (91×100)125 %. = 364/5 %. = 72.8 %. Answer.

# CAT

- **If the length of cuboid is increased by 20%, breadth of cuboid decreased by 12.5% and height is increased by 25%. Find net percentage effect on volume of cuboid.**
- A. 125%
- B. 37.5%
- C. 31.25%
- D. 36.4%


Thank
you