

Percentage concepts

A percentage is a number or ratio that is expressed as a fraction of 100. It is represented by the symbol %. The word "percent" comes from the Latin phrase per centum, which means "by the hundred". Percentages are used to express proportions. For example, if you have an 80% success rate at a task, that means that for every 100 attempts, 80 of them would be successful.

Methods Problem wise

S.no	Types of questions	Numbers	% part	Value of part	Formulas
1	-Find 15% of 360.	Yes	Yes	?	$\frac{15}{100} \times 360$
2	-348 is what percentage of 400	Yes	?	Yes	$\frac{348}{400} \times 100$
3	-72 is 9% of what number	?	Yes	Yes	Let the number be x $\frac{9}{100} x = 72$ $x = 72 \times \frac{100}{9}$

Some important applications and methods to solve:

1. Percentage error

Question1. A boy multiplied a number $\frac{3}{5}$ instead of $\frac{5}{3}$. Find the percentage error in the calculation.

Solution: Assume a number which is a multiple of 3 and 5, the number is 15.

Now $\frac{3}{5}$ of 15 is 9, while it should be $\frac{5}{3}$ of 15 which is 25

It the number obtained is $25 - 9 = 16$ less than the expected number which is 25.

So, percentage error is $\frac{16}{25} \times 100 = 64\%$.

2. Percentage increase and decrease.

Question2. The age of mother is 20% more than that of daughter. Then the age of daughter is what percentage less than that of mother.

Solution: Let the age of daughter is 100. And the age of mother is 20% more than daughter means it is 120.

Then age of daughter is less than mother by $= \frac{20}{120} \times 100 = 16.66\%$

3. Fraction to percentage conversion

Serial No.	Fraction	Percentage in decimal	Percentage in mixed fraction
1	1	100%	100%
2	$\frac{1}{2}$	50%	50%
3	$\frac{1}{3}$	33.33%	$33\frac{1}{3}\%$
4	$\frac{1}{4}$	25%	25%
5	$\frac{1}{5}$	20%	20%
6	$\frac{1}{6}$	16.66%	$16\frac{2}{3}\%$
7	$\frac{1}{7}$	14.28%	$14\frac{2}{7}\%$
8	$\frac{1}{8}$	12.5%	$12\frac{1}{2}\%$
9	$\frac{1}{9}$	11.11%	$11\frac{1}{9}\%$
10	$\frac{1}{10}$	10%	10%
11	$\frac{1}{11}$	9.09%	$9\frac{1}{11}\%$
12	$\frac{1}{12}$	8.33%	$8\frac{1}{3}\%$

4. Difference between percentage and percentile

Percentage

A percentage is a way to show how much of something there is. For example, if you have 100 pieces of candy and you give away 50, you've given away 50% of the candy.

Percentile

A percentile is a way to compare how well someone does compared to other people. For example, if you get a 90% on a test, you did better than 90% of the other students who took the test.

5. Appreciation and depreciation

Question: The value of a washing machine depreciates at the rate of 10% every year. If its present value is Rs. 8748, then what was the price of the washing machine three years ago?

Solution: Given,

Current price of the washing machine = Rs.8748

The price of the machine depreciated at the rate of 10% every year

Therefore, the price of the washing machine three years ago = $8748 \div (1 - 10/100)^3$

= Rs. $[8748 \times (10/9) \times (10/9) \times (10/9)]$

= Rs.12000

6. Election based questions

Question: In an election between two candidates the winner candidate got 56% of the total valid votes and wins by a majority of 3600 votes. Find the total votes polled?

Solution: Let the total votes be x ,

Votes secured by winner = $56\%x$

Then votes of loser = $x - 56\%x = 44\%x$

Majority = $56\%x - 44\%x = 12\%x$

$12\%x = 3600$

$x = 3600/12 \times 100 = 30000$

7. Premium on insurance

Question: A tempo is insured to the extent of $4/5$ of its original value. If the premium on it at the rate of 1.3 percent and the market value of tempo is Rs. 10 lakhs. Find the premium?

Solution: The insured value of the tempo is $4/5$ of Rs. 10 lakhs = Rs. 8 lakhs

Value of premium = 1.3% of Rs. 8 lakhs = $\frac{1.3}{100} \times 800000 = \text{Rs. } 10400$

8. Taxes

Question: Gauri went to the stationers and bought things worth Rs. 25, out of which 30 paise went on sales tax on taxable purchases. If the tax rate was 6%, then what was the cost of the tax free items?

Solution: Let the amount selling price be Rs. x .

Then, 6% of $x = 30$ paise

$x = 30/6 \times 100 = 500$ paise which is equal to Rs. 5

Selling price including tax = Rs. 5 + 0.3 = Rs. 5.3

Value of tax free items = Rs. 25 - Rs. 5.3 = Rs. 19.7