

Percentage formulas cheat sheet

Ten formulas. Choose the baseline first. Use 15 for 15% in the written formulas below.

Question	Formula	Worked example
Percentage of a number	$\text{rate} \div 100 \times \text{number}$	$15 \div 100 \times 200 = 30$
Part as a percentage	$\text{part} \div \text{total} \times 100$	$30 \div 200 \times 100 = 15\%$
Find the whole	$\text{part} \div (\text{rate} \div 100)$	$30 \div 0.15 = 200$
Percentage increase or decrease	$(\text{new} - \text{original}) \div \text{original} \times 100$	$(100 - 80) \div 80 \times 100 = 25\%$
Percentage difference	$\text{absolute gap} \div \text{average} \times 100$	$20 \div 90 \times 100 \approx 22.22\%$
Percentage points	$\text{new percentage} - \text{old percentage}$	$25\% - 20\% = 5 \text{ percentage points}$
Final price after a discount	$\text{original} \times (1 - \text{rate} \div 100)$	$200 \times 0.85 = 170$
Final amount after an increase	$\text{original} \times (1 + \text{rate} \div 100)$	$200 \times 1.15 = 230$
Original before a discount	$\text{final} \div (1 - \text{rate} \div 100)$	$800 \div 0.8 = 1,000$
Original before an increase	$\text{final} \div (1 + \text{rate} \div 100)$	$1,200 \div 1.2 = 1,000$

Read the units: a percentage amount, a percentage rate and a percentage-point gap are different answers. $\approx$ means approximately equal.

For difference, $\text{average} = (\text{first} + \text{second}) \div 2$. Compare non-negative values. Two zero values make the formula undefined; our tool reports 0% by convention. Percentage change here uses a positive original. Do not divide by zero.

A reverse discount must be below 100%. After 20% off, divide the final price by 0.8; adding 20% back uses the wrong baseline.

More examples and tools: YourPercentageCalculator.com/percentage-formulas-cheat-sheet/