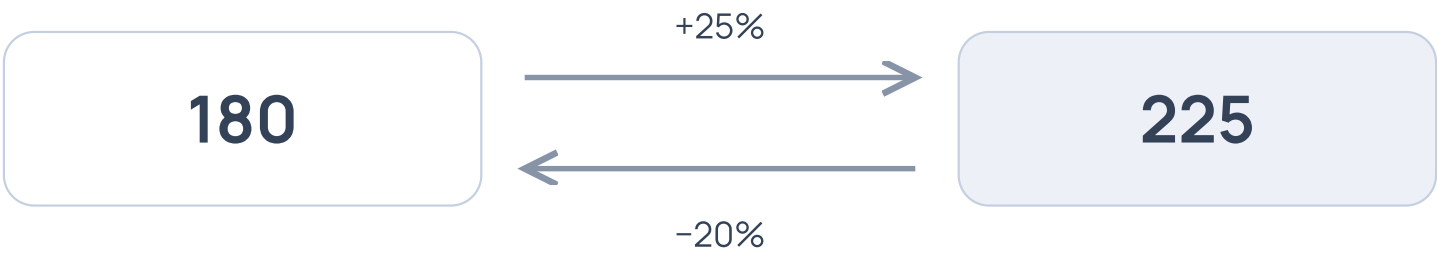


Choose the right percentage base

A four-step workflow to decode wording, fix the denominator and avoid base-shift traps

Percentage Base Workflow



The difference is 45 in both directions; the denominator changes.

The percentage changes with the base

01 Decode the Question Phrase

- 'A is what % of B' uses $A/B \times 100$; 'A exceeds B by what %' uses $(A - B)/B \times 100$.
- A percentage is meaningless until you name the reference quantity on which it acts.
- Percentage change from initial value I to final value F is $((F - I)/I) \times 100$.



02 Fix the Reference Denominator

- Name the reference quantity explicitly; place that value in the denominator.
- Example: 82 exceeds 60 by $(82 - 60)/60 \times 100 \approx 36.67\%$.
- Rising from 180 to 225 is $45/180 \times 100 = 25\%$; reversing 225 to 180 is $45/225 \times 100 = 20\%$.



03 Combine Groups and Invert Rates

- For combined groups, sum numerators and denominators first: $(480 + 720)/(600 + 900) = 80\%$.
- If a known part equals r% of the whole, find the whole via $Total = Part \div (r/100)$: $10 \div 0.40 = 25$.
- For unequal groups, use group sizes as weights instead of an unweighted mean of rates.



04 Simplify First, Round Last

- Cancel common factors before multiplying: $1890/2160$ reduces to $7/8$, giving 87.5%.
- Distinguish percentage-point gap ($60\% - 50\% = 10$ points) from relative change ($10/50 = 20\%$).
- Keep exact fractions until the final step, then round: $80/310 \times 100 = 800/31\% \approx 25.81\%$.

REMEMBER Write the base before calculating: percentage share and percentage increase have different numerators.