

Percentages Cheat Sheet

Per cent means out of 100. Four skills, one idea: turn the percentage into a decimal and multiply or divide.

% Fractions, decimals, percentages

$37\% = 37/100 = 0.37$

Per cent means per hundred
A percentage is a fraction out of 100. 100% is the whole amount, and percentages above 100% are allowed.

$3/8 = 0.375 = 37.5\%$

Fraction to percentage
Divide the top by the bottom, then multiply by 100.

$45\% = 0.45 = 9/20$

Percentage to decimal or fraction
Divide by 100 for the decimal. Write over 100 and simplify for the fraction.

Percentage of an amount

$35\% \text{ of } 240 = 72 + 12 = 84$

Build it from 10%
No calculator: 10% is $\div 10$, 5% is half of that, 1% is $\div 100$. Add the pieces you need.

$0.35 \times 240 = 84$

Use the decimal
Calculator: change the percentage to a decimal and multiply.

$18 \text{ out of } 24: 18 \div 24 \times 100 = 75\%$

One amount as a % of another
Make a fraction, then multiply by 100. Put both amounts in the same unit first.

↗ Increase, decrease and change

$\text{GBP } 60 \times 1.15 = \text{GBP } 69$

Increase by 15%
Keep 100% and add 15%: the multiplier is 1.15.

$\text{EUR } 80 \times 0.75 = \text{EUR } 60$

Decrease by 25%
Keep 100% and take off 25%: the multiplier is 0.75.

$12 \div 50 \times 100 = 24\%$

Percentage change
Divide the change by the original value, then multiply by 100. USD 50 rising to USD 62 is a 24% increase.

↶ Reverse percentages

$360 \div 0.8 = \text{GBP } 450$

Find the original value
After 20% off, a phone costs GBP 360. That is 80% of the original, so divide by 0.8.

Check: $450 \times 0.8 = 360$

Do not add the 20% back
 $360 \times 1.2 = 432$ is wrong: the 20% was taken off the original price, not the sale price.

$100 \times 1.1 \times 0.9 = 99$

Up 10%, then down 10%
You do not get back to the start, because the second 10% is taken of a bigger amount.



Always ask: a percentage of what?

Percentage changes are always worked out from the original value. Divide by the starting amount, never the new one, and check your answer with a multiplier.

