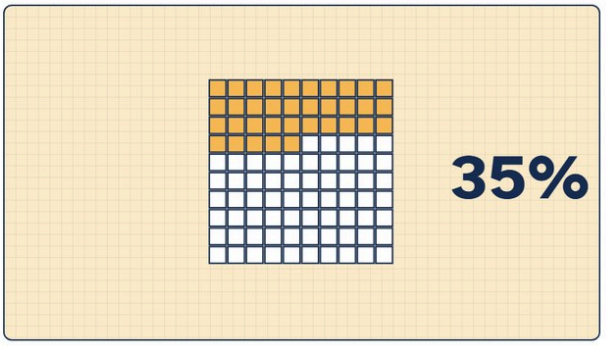
Maths · Fractions, decimals, percentage change and reverse percentages

Percentages



Percentages

Teacher notes

Show a sale sign such as "Up to 40% off" and ask: if a EUR 50 top is 40% off, is it now EUR 10? Collect answers without correcting them yet. Tell students that by the end of the lesson they will be able to check any sale price, pay rise or test score in one step.

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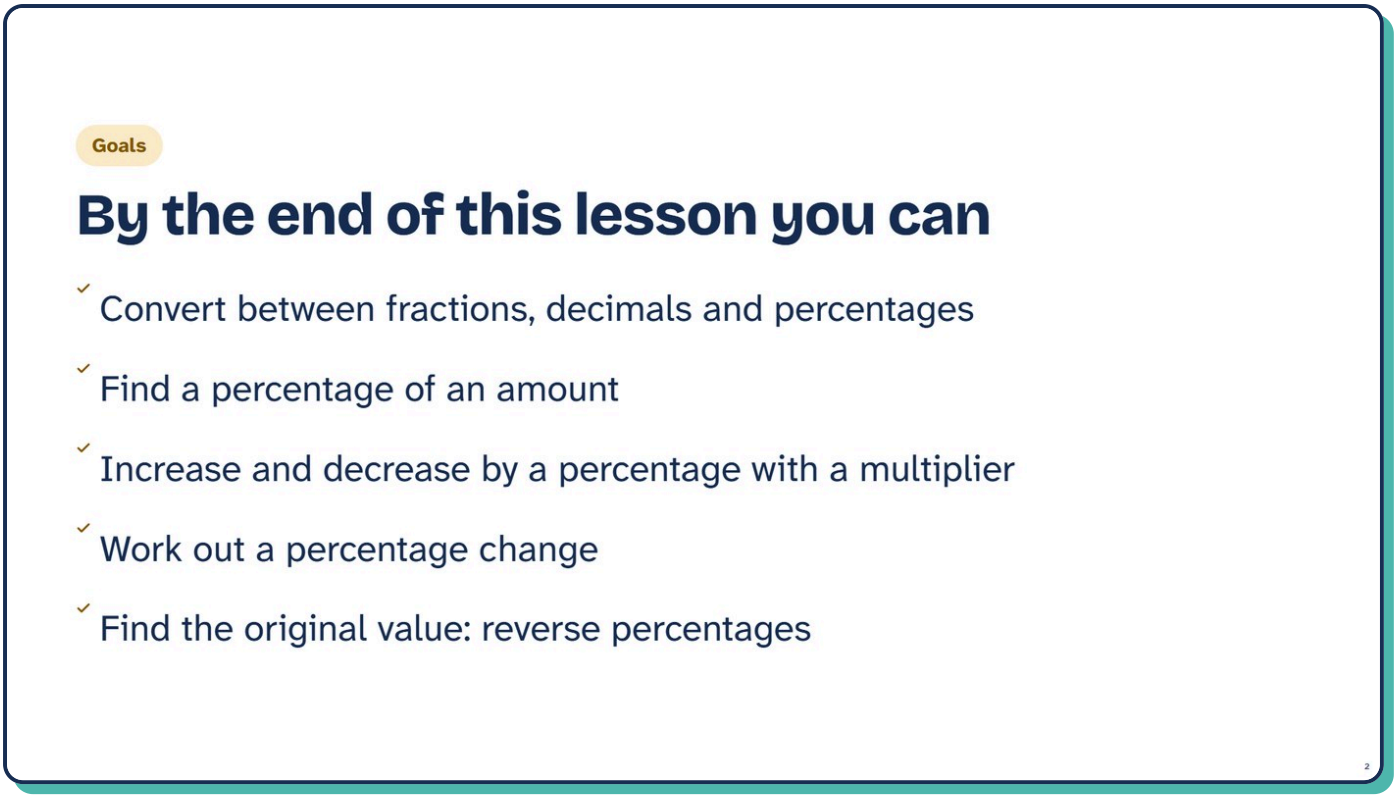
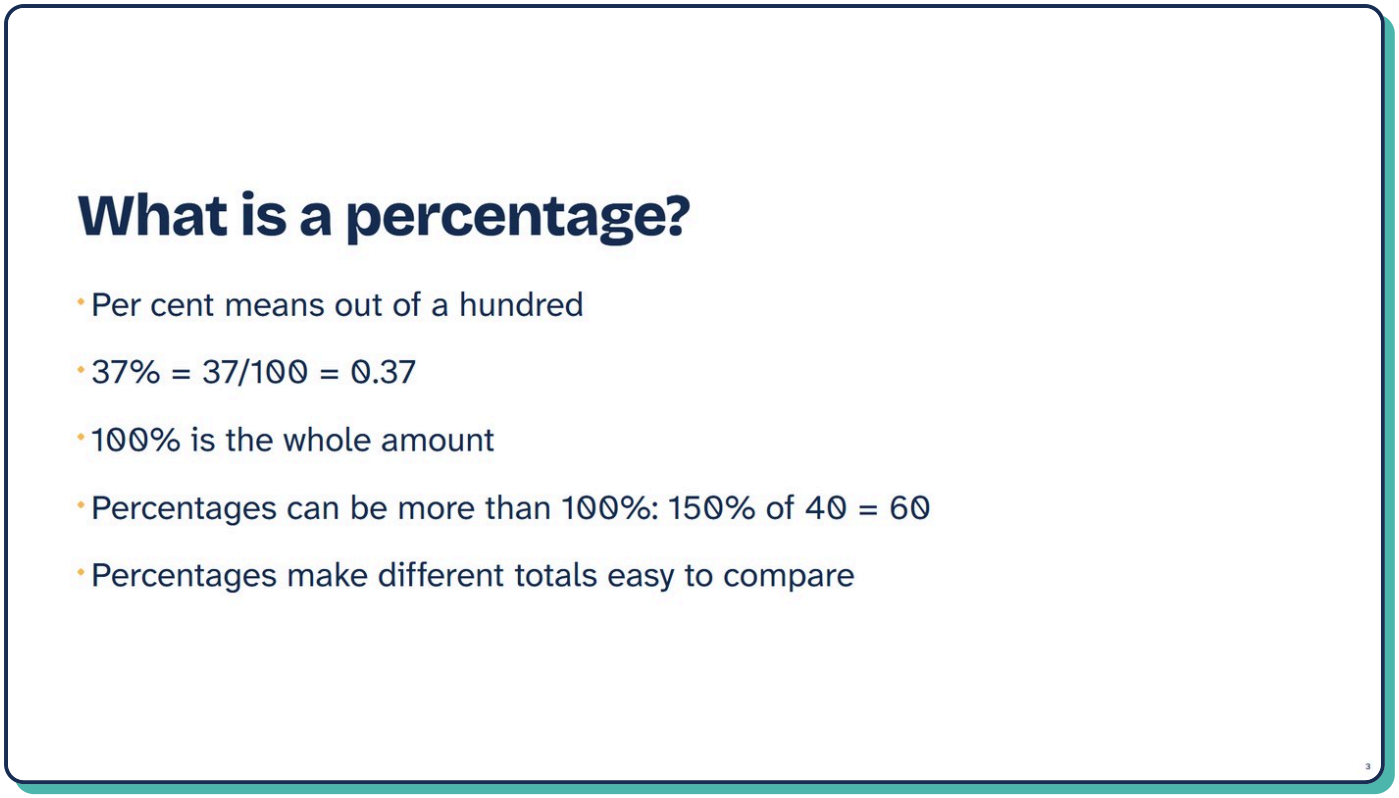


By the end of this lesson you can

Teacher notes

Read the objectives aloud. Tell students there is a five-question quiz at the end, and that the multiplier idea on slide 9 is the one tool that ties everything together.



What is a percentage?

Teacher notes

Shade 37 squares of a 10 by 10 grid to show 37%. Ask: what would 100% look like, and what would 150% look like? Some students believe a percentage can never go above 100; a price that rises by half to 150% of its old value is a good counter-example.

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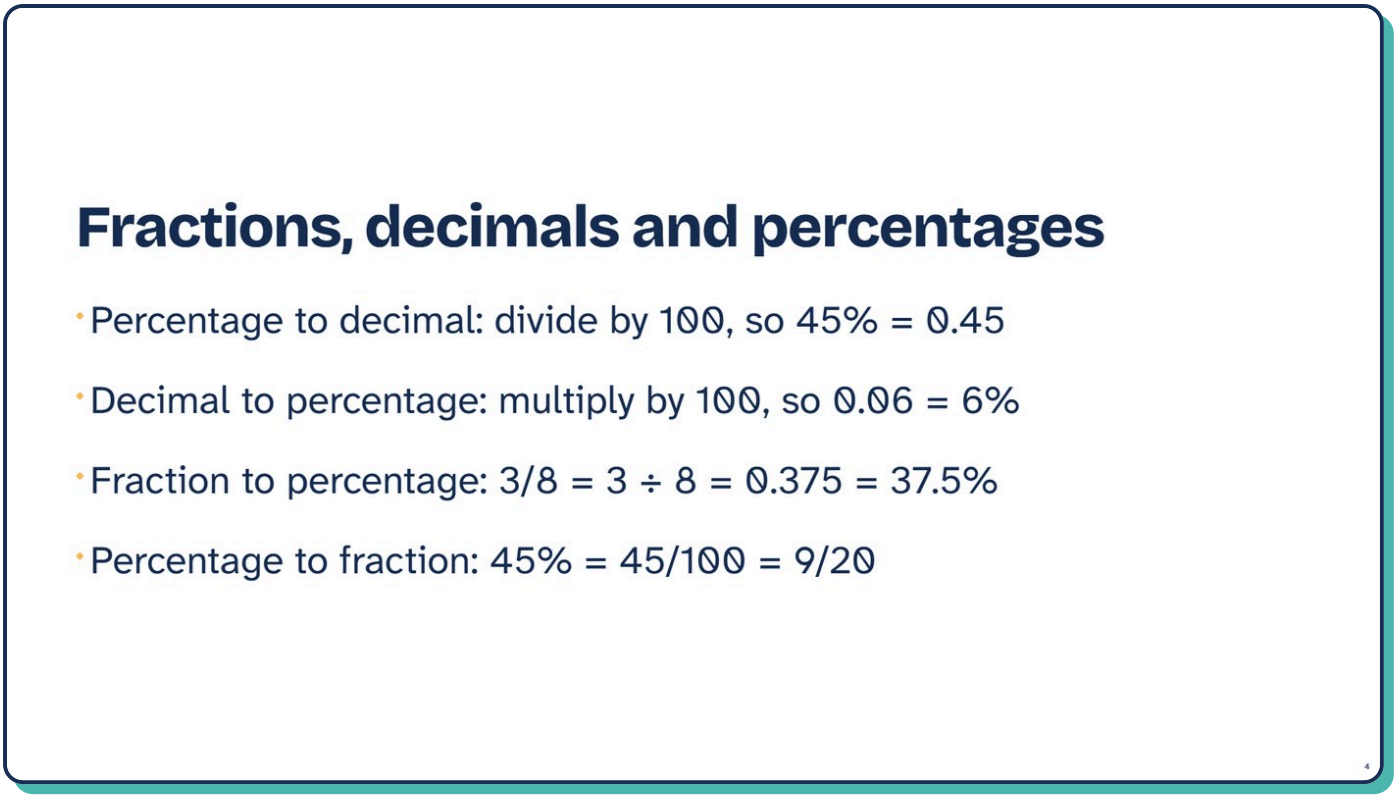
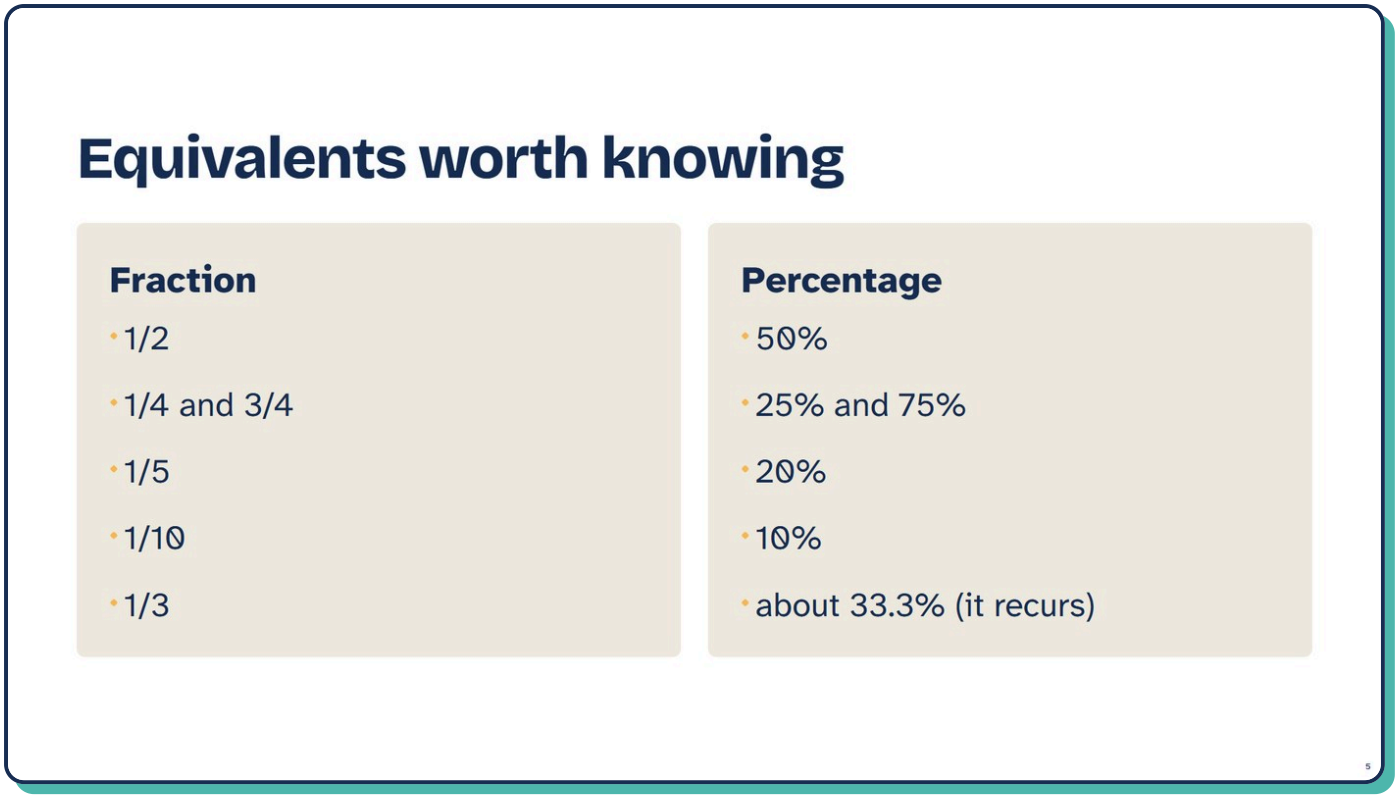


Fractions, decimals and percentages

Teacher notes

Work through each conversion on the board. A very common error is writing 0.06 as 60%; ask students to say the decimal as 6 hundredths before converting. Ask: which is bigger, 3/8 or 40%? Converting both to percentages gives 37.5% and 40%, so 40% is bigger.



Equivalents worth knowing

Teacher notes

Cover one column and ask students to call out the other. Point out that 1/3 is 33.333…% and never ends, so we round it. Ask: what is 2/5 as a percentage? Two lots of 20% gives 40%.

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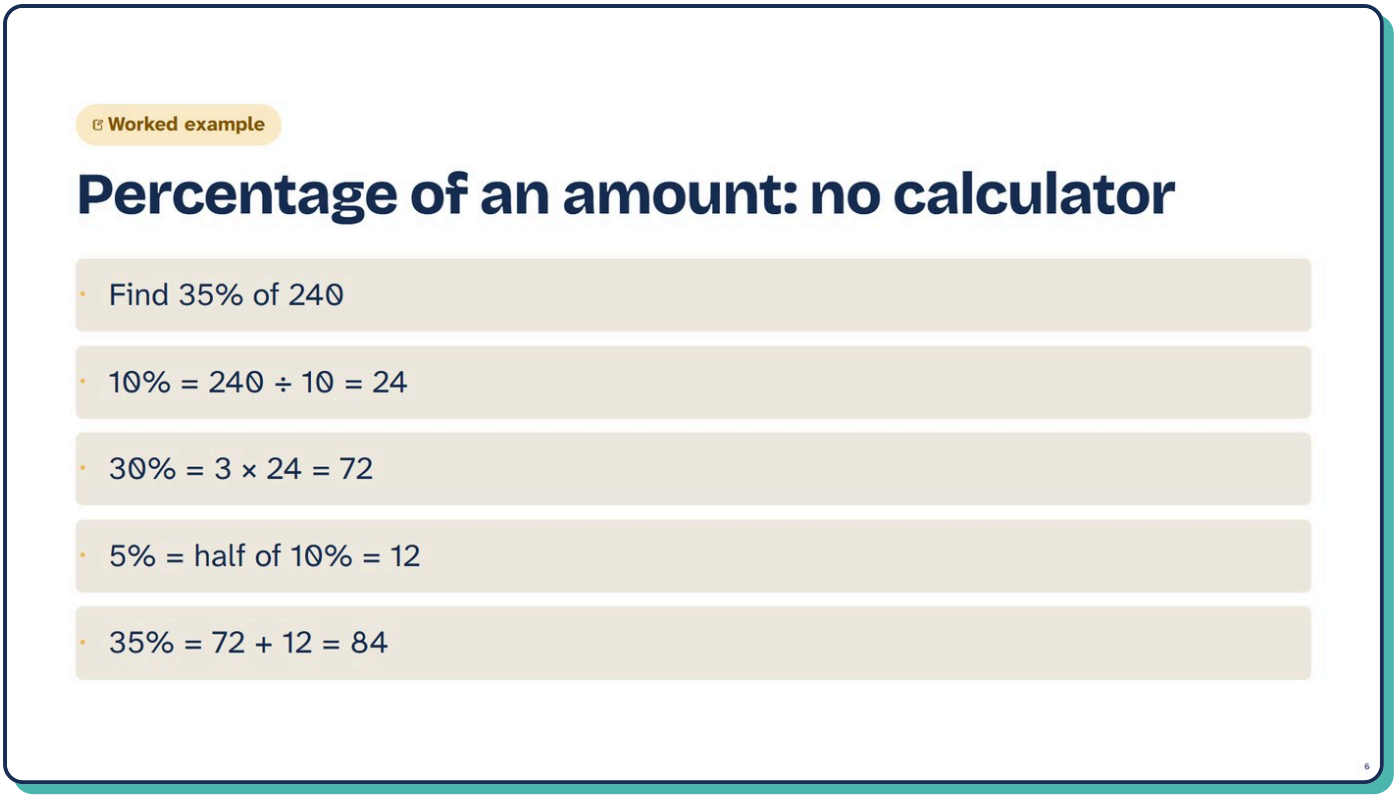

Percentage of an amount: no calculator

Teacher notes

Model the building-block method step by step. Ask a student to find 12% of 240 the same way: 10% is 24, 1% is 2.4, so 12% is 24 + 2.4 + 2.4 = 28.8. Watch for students who find 10% by dividing by 100 instead of 10.

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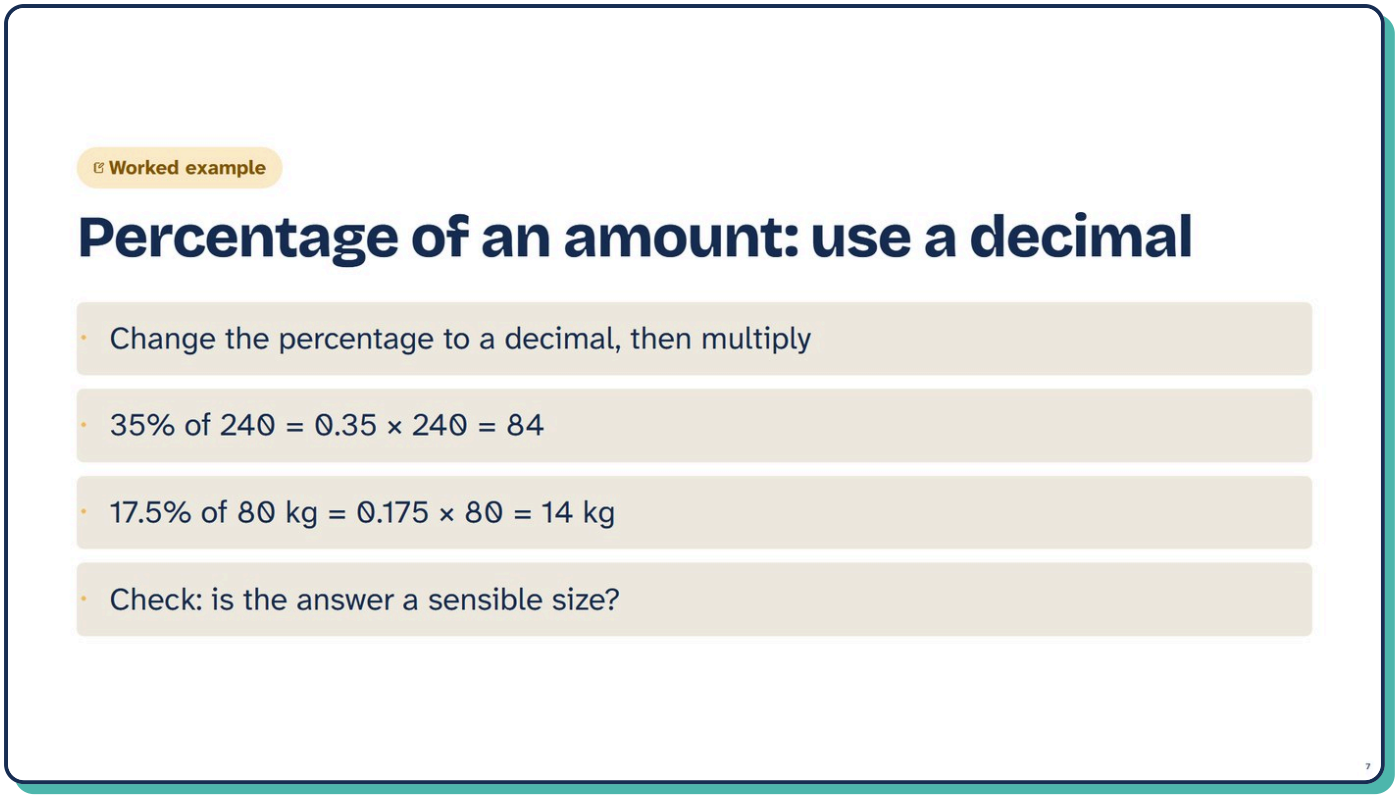
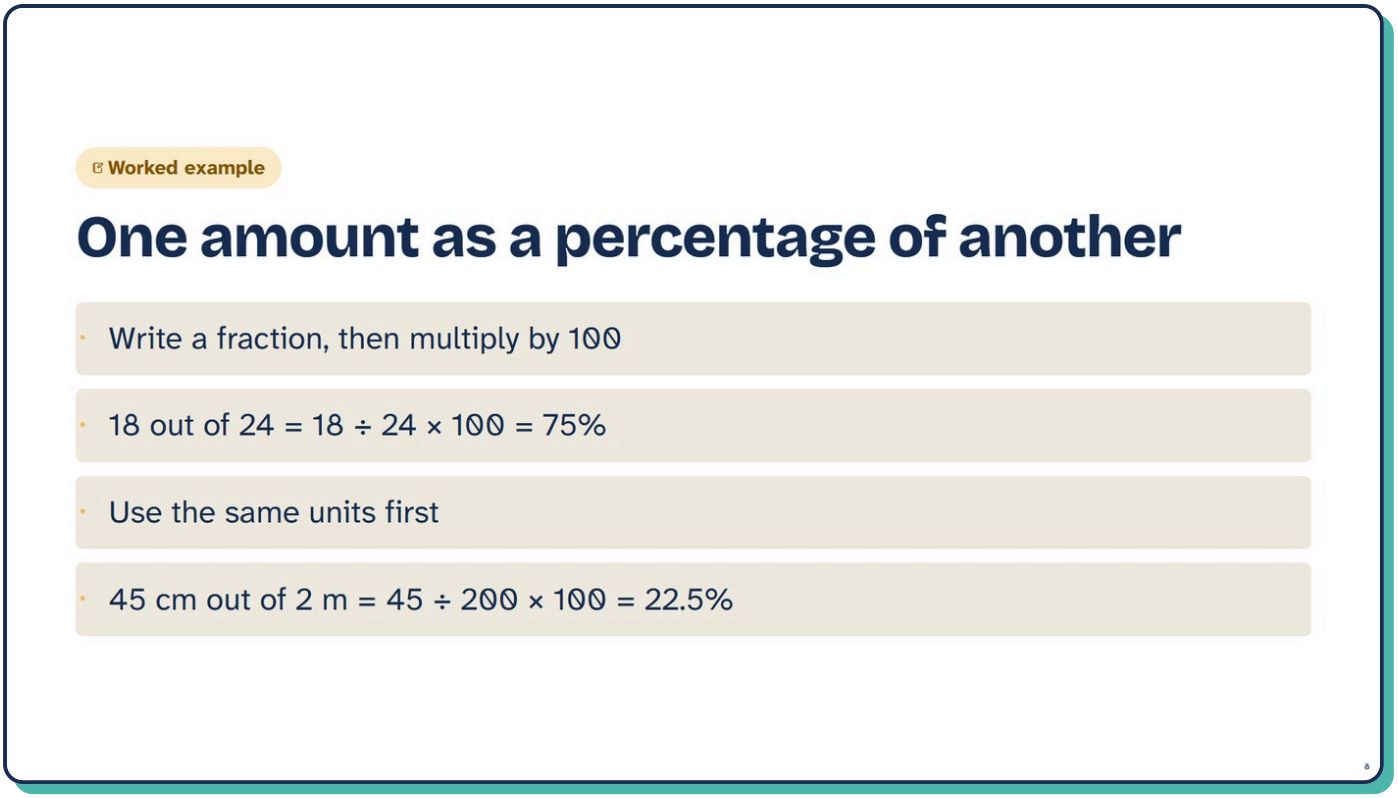


Percentage of an amount: use a decimal

Teacher notes

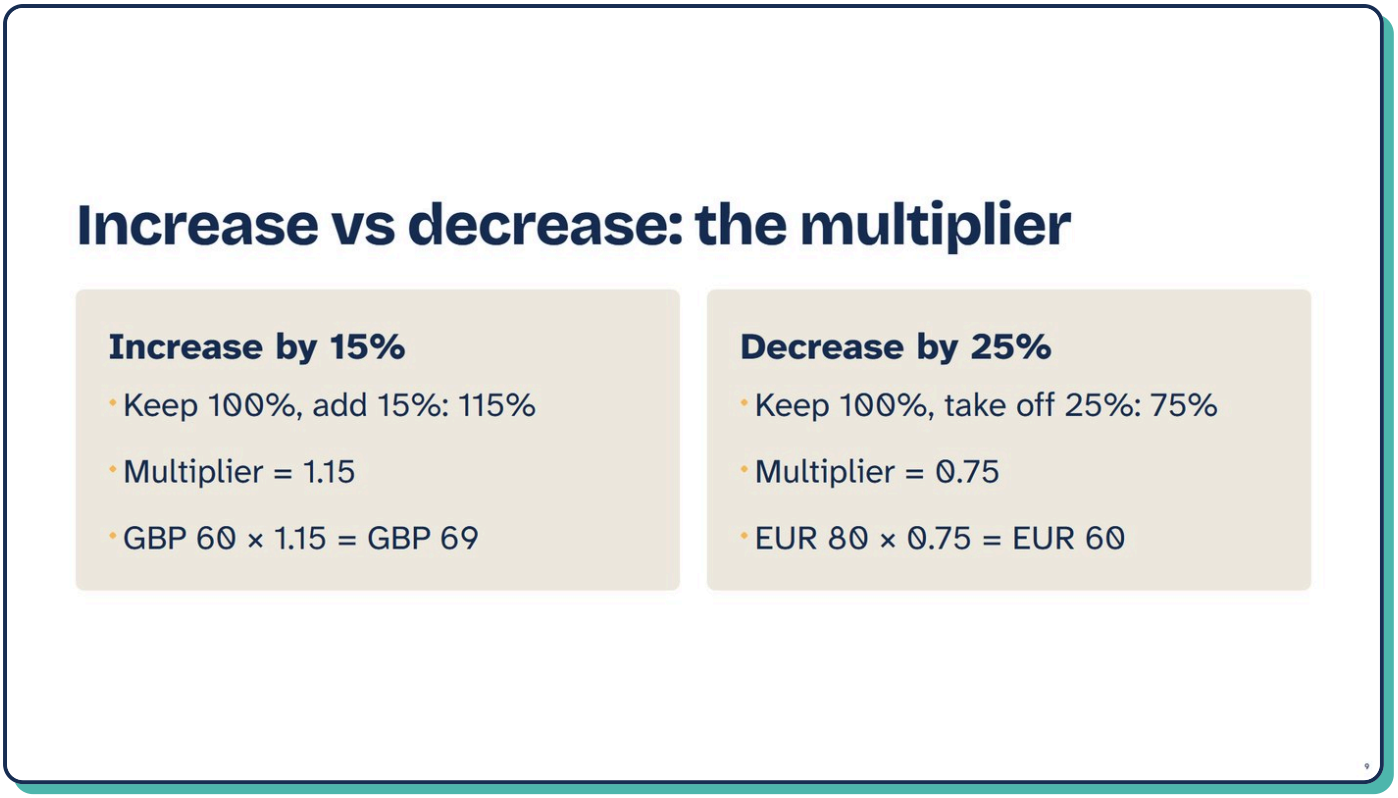
Show that both methods give 84. Ask: should 17.5% of 80 kg be more or less than 20 kg? Less, because 25% would be 20 kg. Estimating first catches typing errors on the calculator.



One amount as a percentage of another

Teacher notes

A test score is the most familiar example: 18 marks out of 24 is 75%. Ask: what goes wrong if we work out 45 ÷ 2 × 100? We get 2,250%, which cannot be right for a part of a length. 2 m must become 200 cm before dividing.



Increase vs decrease: the multiplier

Teacher notes

Show the two-step method once (60 + 9 = 69 and 80 – 20 = 60), then show that the multiplier does it in one step. Ask: what multiplier increases by 3%? 1.03. What multiplier decreases by 8%? 0.92. A common mistake is 0.08 for an 8% decrease.

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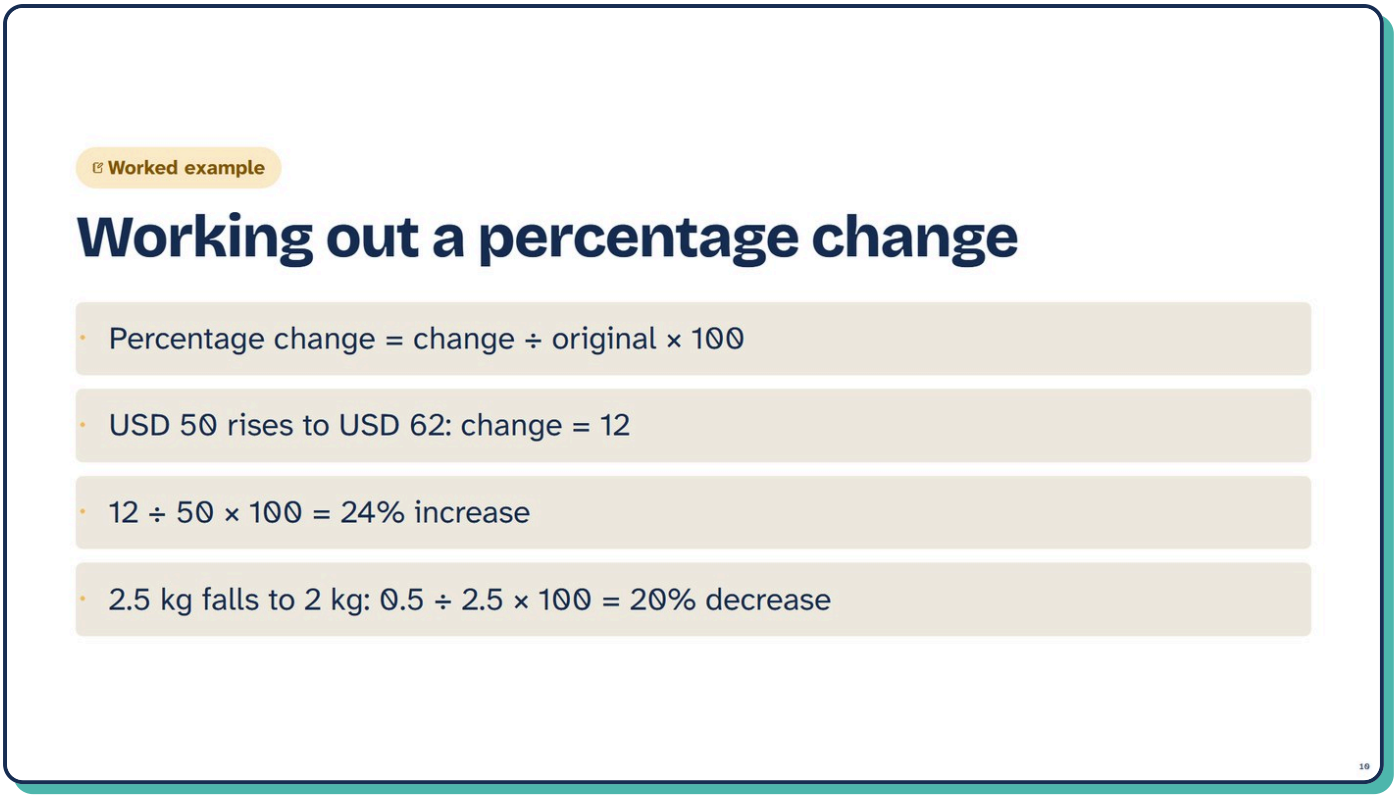
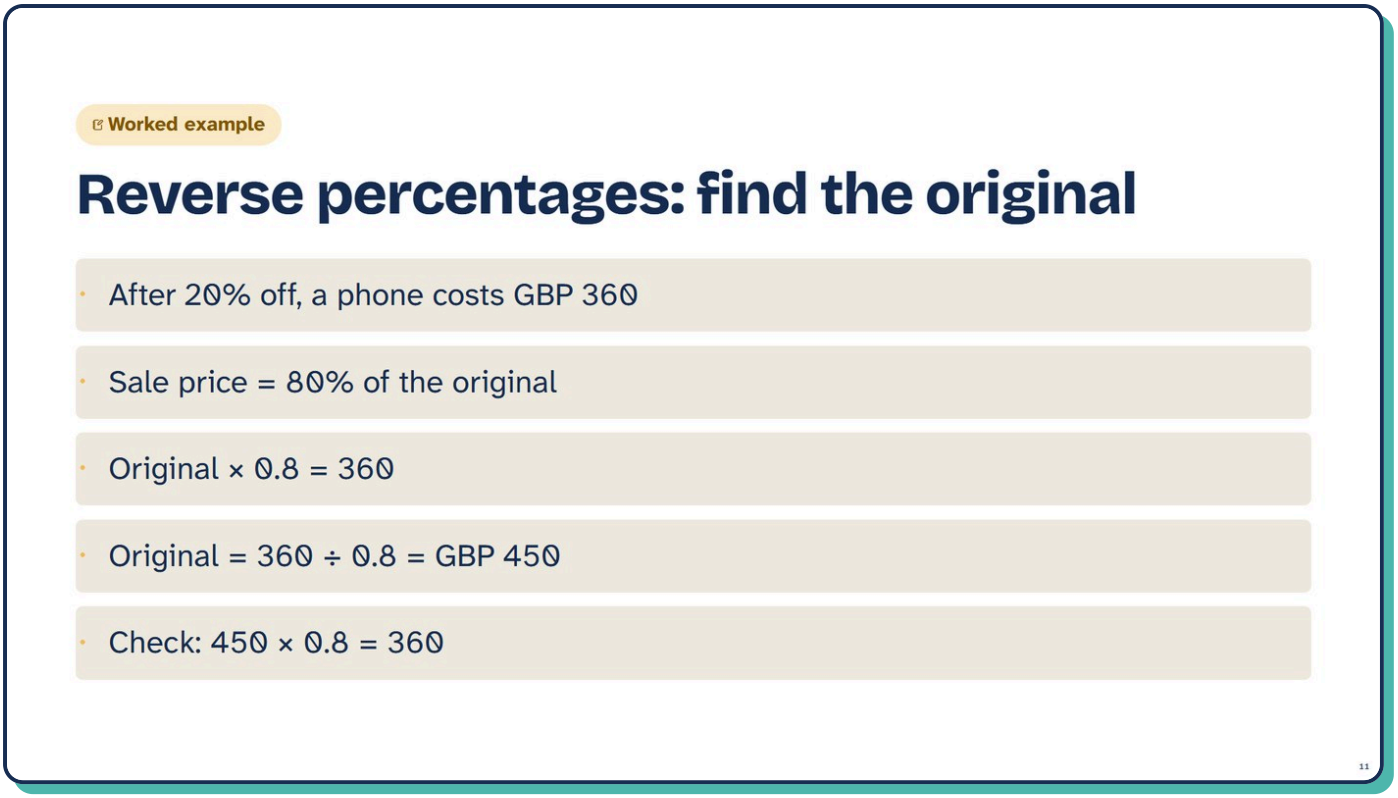


Working out a percentage change

Teacher notes

Stress the word original. Ask: what happens if we divide 12 by 62 instead? We get about 19.4%, which is wrong because the change is measured from where we started. Check the answer with a multiplier: 50 × 1.24 = 62.



Reverse percentages: find the original

Teacher notes

Draw a bar split into ten equal parts: eight parts are worth GBP 360, so one part is GBP 45 and ten parts are GBP 450. Ask: a price including a 20% sales tax is EUR 96. What was it before tax? 96 ÷ 1.2 = EUR 80.

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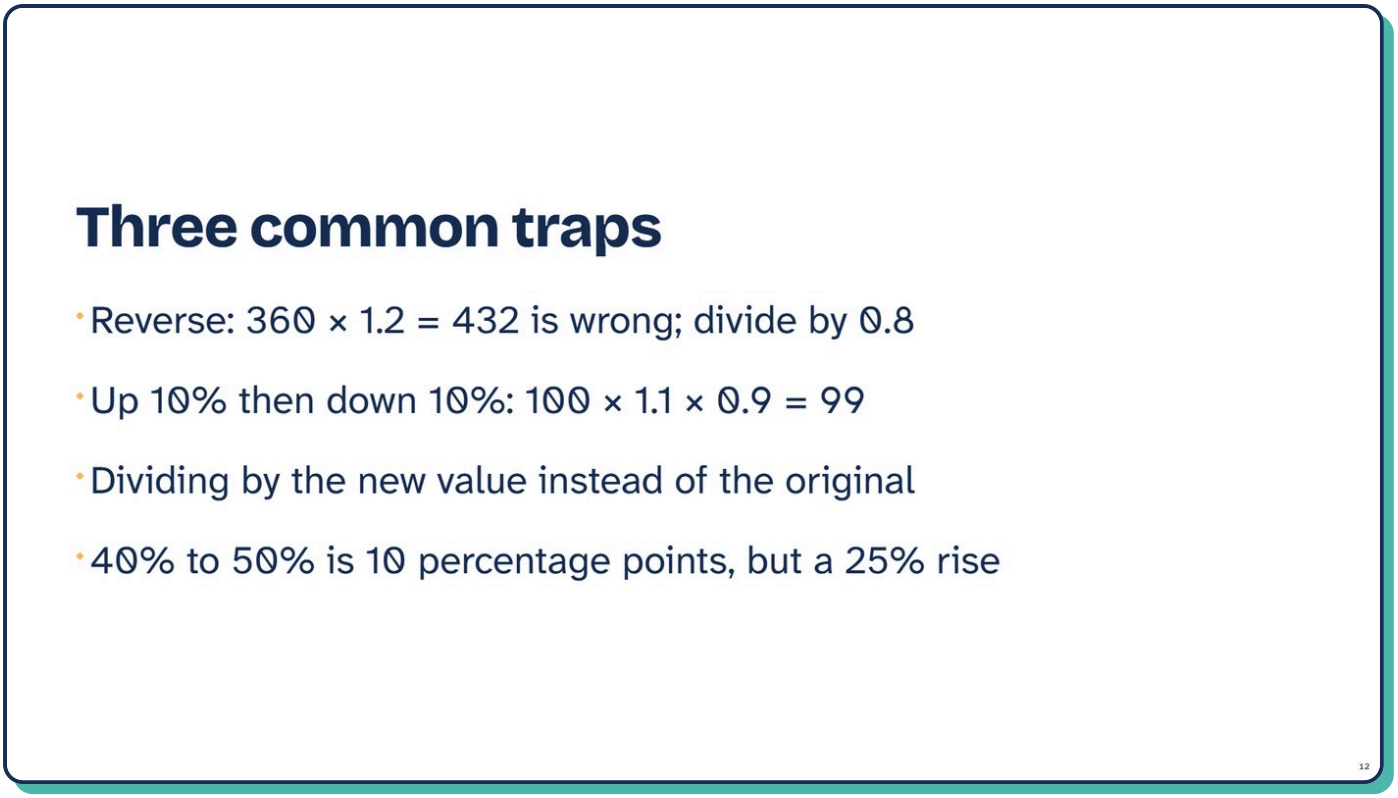
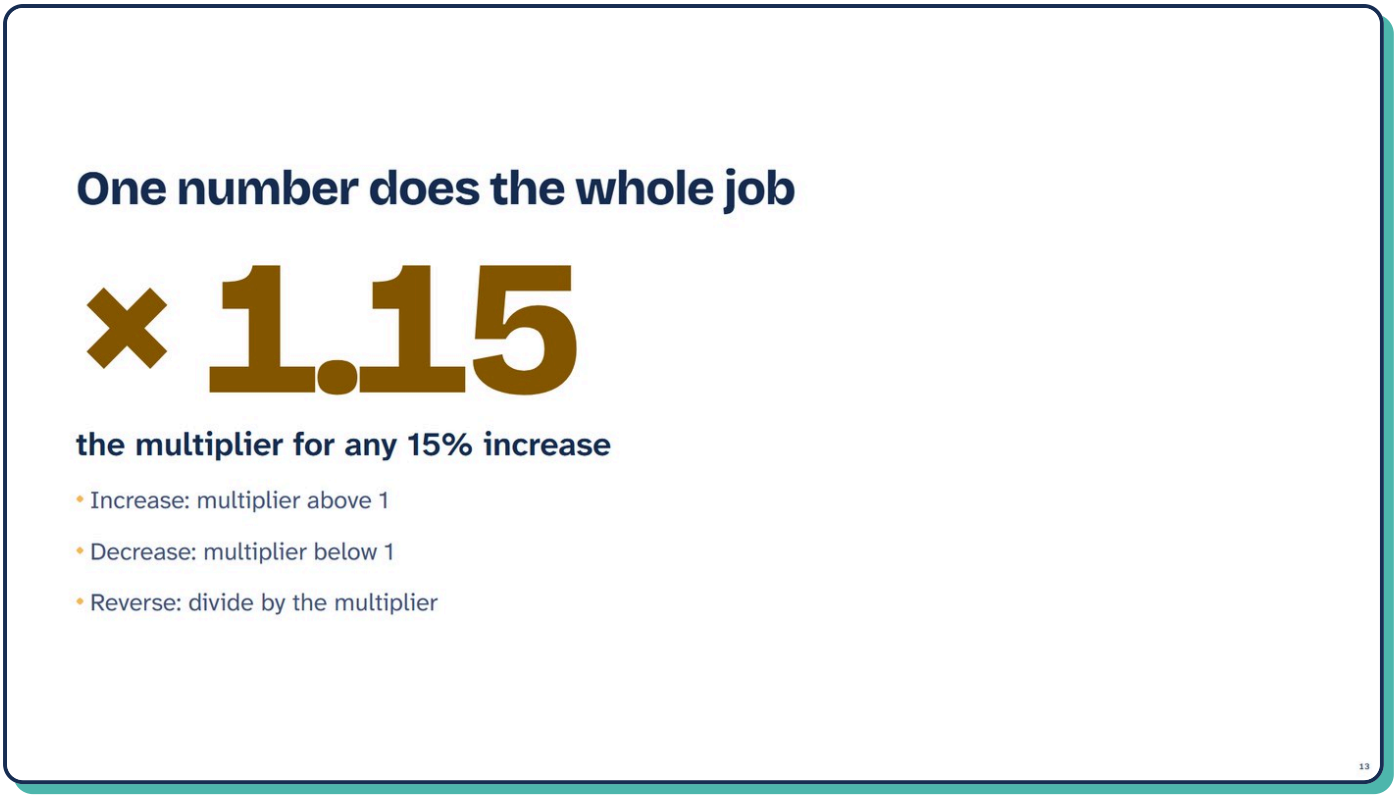


Three common traps

Teacher notes

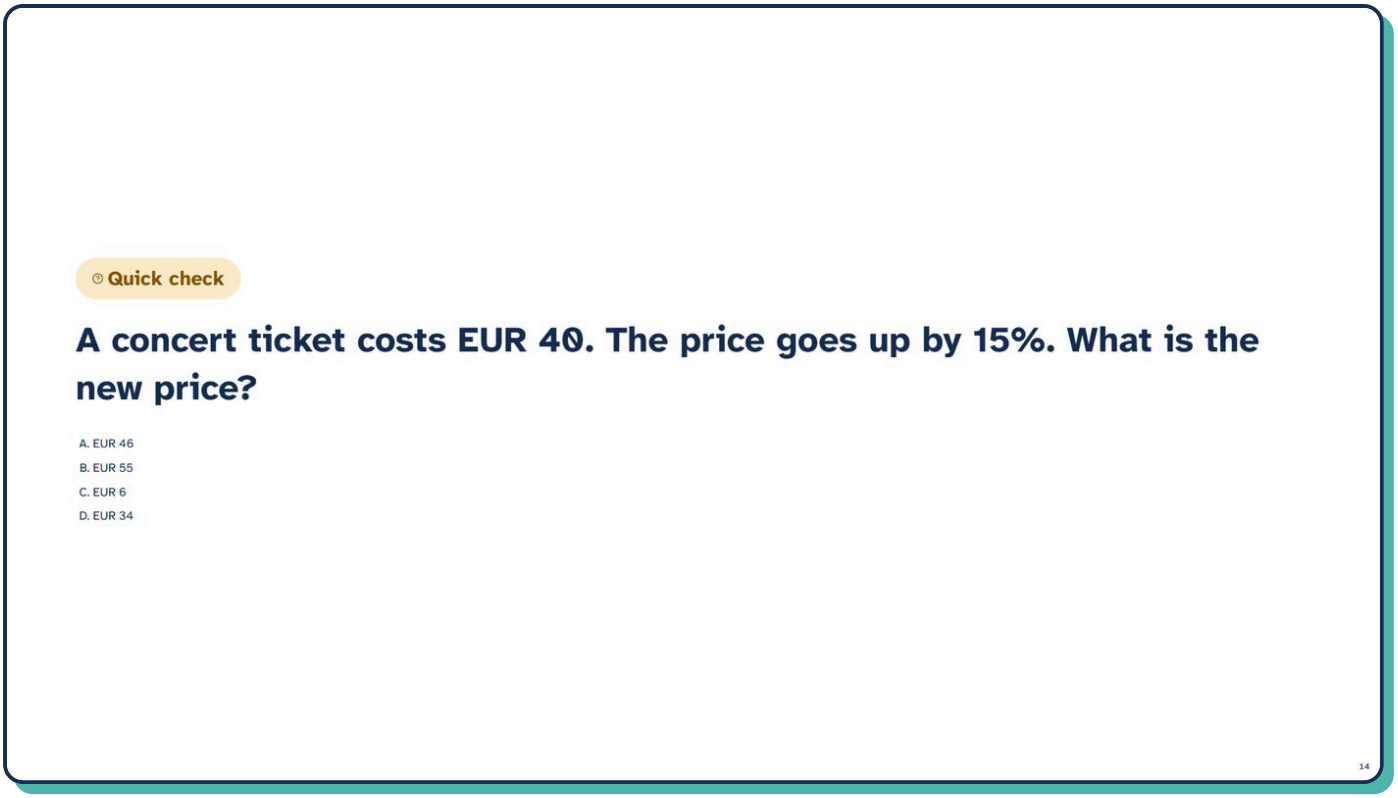
Take each trap in turn and ask students to explain why it fails. The last one appears in news reports: a rise from 40% to 50% is 10 percentage points, but as a percentage change it is 10 ÷ 40 × 100 = 25%. This line is an extension for older students.



One number does the whole job

Teacher notes

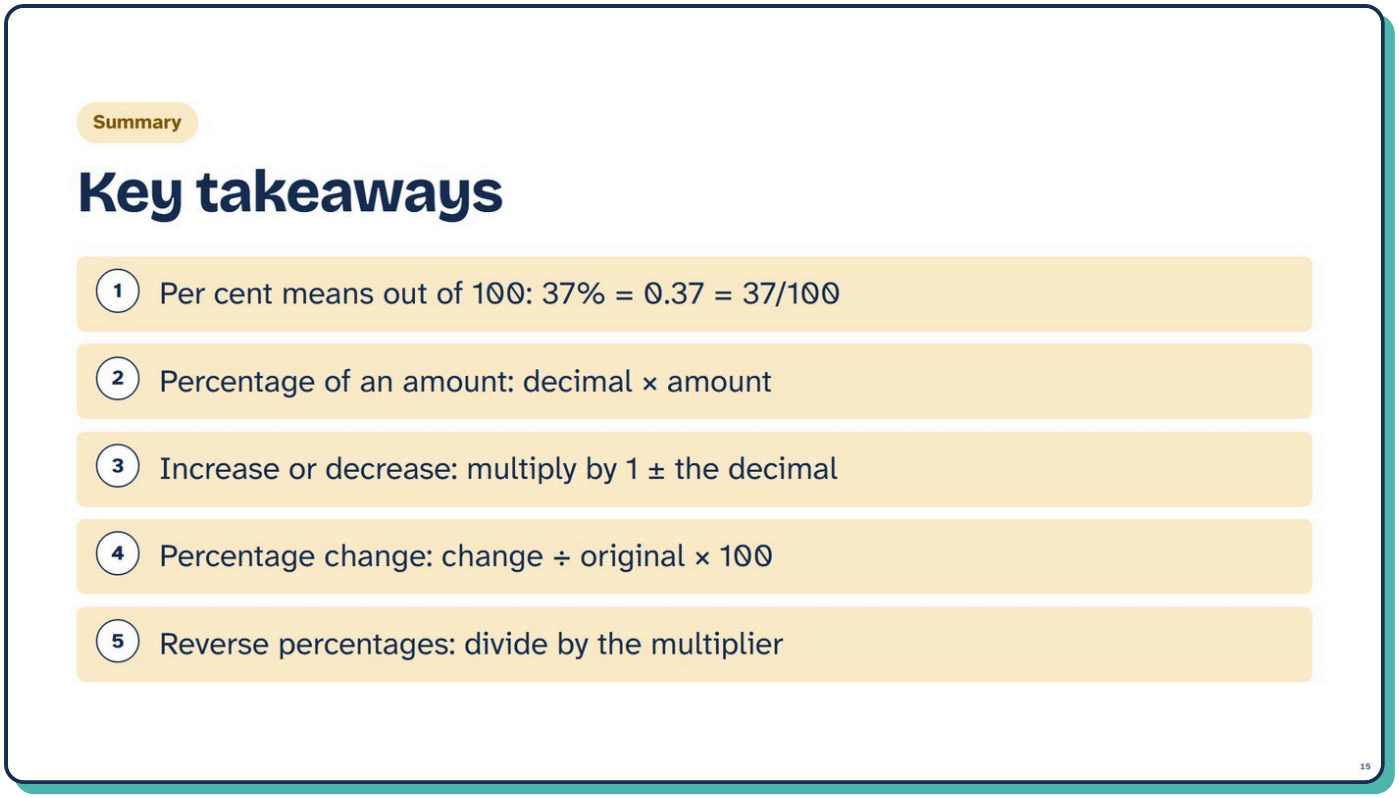
Summarise the multiplier idea before the quick check. Ask students to give the multiplier for a 7% increase (1.07), a 30% decrease (0.7) and a 100% increase (2). Doubling is a 100% increase, which surprises many students.



Quick check

Teacher notes

Answer: A, EUR 46, because 40 × 1.15 = 46. EUR 55 comes from adding 15 to 40, EUR 6 is only the increase, and EUR 34 is a 15% decrease. Ask students who chose each wrong answer to spot their own mistake.



Key takeaways

Teacher notes

Recap one example for each bullet aloud. Then move to the five-question quiz on the page and set the worksheet for practice.