Percentages and percentage change

Leaving Certificate · Ordinary Level

Understand the idea

How to start

Percent means out of 100. So 20% is 20 out of 100, or 0.20.

1. Underline the amount the percentage is based on.
2. Find the percentage amount, then add or subtract it if the question asks for a change.
3. If you know the final price and need the original price, work backwards by dividing by the multiplier.

Key terms & definitions

Percentage
An amount expressed as a number of hundredths.

Multiplier
The factor used to calculate a percentage increase or decrease.

Original amount
The starting value before a change.

Key ideas

• Percent means out of 100. Divide a percentage by 100 to make a decimal multiplier.

• Find a percentage of an amount by multiplying. Increase by 15% using 1.15; decrease by 15% using 0.85.

• Percentage change uses the original amount as the denominator: $\frac{\text{change}}{\text{original}} \times 100\%$.

• For a reverse percentage, divide the final amount by the multiplier. Do not subtract the percentage from the final amount.

• Distinguish an absolute change from a relative change: the same increase can be a very different percentage of different starting values.

Quick reminder

• Decide what represents 100%.

• Forward change: multiply by the percentage multiplier.

• Reverse change: divide the final amount by the multiplier.

Worked examples

Example 01 · Fractions, decimals and percentages

Write 0.4 as a percentage.

Why this method?

Decide which amount represents 100%. This tells us what to multiply or divide by.

$0.4 = 0.40 = \frac{40}{100}$	**Step 1** Write four tenths as forty hundredths.
$\frac{40}{100} = 40\%$	**Step 2** Percent means out of 100, so the numerator gives the percentage.

Think about it: Why is 0.4 equal to 40%, not 4%?

Example 02 · Find a percentage of an amount

Find 20% of $€60$.

Why this method?

Decide which amount represents 100%. This tells us what to multiply or divide by.

$20\% = \frac{20}{100} = 0.2$	**Step 1** Change the percentage into a multiplier.
$0.2 \times 60 = 12$	**Step 2** Multiply the whole amount, $€60$, by 0.2.
20% of $€60$ is $€12$.	**Step 3** Include the euro unit because we found an amount of money.

Think about it: Why does dividing by 5 work for 20%?

Example 03 · Percentage increase and decrease

A €50 item increases by 20%. Find the new price.

Why this method?

Decide which amount represents 100%. This tells us what to multiply or divide by.

20% of $50 = 10$	**Step 1** Find 20% of the original €50
increase $= €10$	**Step 2** This €10 is the increase, not the final price
$€50 + €10 = €60$	**Step 3** Add the increase to the original price

Think about it: Why is €10 not the final answer?

Example 04 · Absolute and relative comparison

A score rises from 70 to 80. Compare the change.

Why this method?

Decide which amount represents 100%. This tells us what to multiply or divide by.

$80 - 70 = 10$ points	**Step 1** Find the absolute increase
$\frac{10}{70} \approx 0.143$	**Step 2** For the relative increase, compare the change with the starting value
relative increase $\approx 14.3\%$	**Step 3** Write as a percentage

Think about it: Why is 70, not 80, the reference value for the increase?

Example 05 · Reverse a discount

A jacket costs €68 after $a15\%$ discount. Find its original price.

Why this method?

Decide which amount represents 100%. This tells us what to multiply or divide by.

The final price is 85% of the original.	**Step 1** Identify the remaining percentage

$0.85P = 68$ so $P = \frac{68}{0.85} = 80$.	**Step 2** Write and solve
15% of €80 is €12; €80 minus €12 is €68. Original price: €80.	**Step 3** Apply the stated percentage change to the original amount and check that it gives the stated final price.

Example 06 · Reverse a percentage change

After a 15% increase a price is €138. Find the original price.

$1.15 \times \text{original} = 138$	**Step 1** The new price is 115% of the original.
€138 ÷ 1.15 = €120	**Final step** Reverse the multiplier by dividing.

Common mistake

Assuming equal percentage increases and decreases cancel. Starting at €100, a 20% decrease gives €80; a 20% increase on €80 gives €96. The second percentage uses a different starting amount.

Exam technique

Label which amount represents 100% before beginning.

Try it yourself

Work on paper before checking the answers at the end. These questions are for self-checking, not submitted homework.

Question 1

Write 0.7 as a percentage.

A. 700%

B. 0.7%

C. 7%

D. 70%

Question 2

Find 25% of 80.

Watch an explanation

Corbettmaths — Percentages: of an amount (non-calc)

Cognito — Percentage Increases & Decreases (Multiplier Method)

Cognito — Reverse Percentage - Finding Price Before a % Discount

Open the website chapter to load the embedded players. Use the rates and rules in your question for financial examples.

Self-check answers

Question 1

70%

Compare your method with the worked examples.

Question 2

20

Compare your method with the worked examples.

Open the full chapter online