

Learning with a method

Understand, calculate, explain

01

5 LESSONS + ANSWERS

1. Understand what the task asks
2. Add fractions
3. Recognise a proportion

Before you begin

This short book offers five independent activities: reading instructions, working with fractions, solving a proportion, checking information and preparing a revision session. Examples are fictional and answers explain the method. The middle-school level is approximate; the book does not replace your classes or your teacher's instructions. Try each challenge before reading the final page.

03 / 1. Understand what the task asks

04 / 2. Add fractions

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06 / 4. Check a piece of information

07 / 5. Prepare a useful revision session

Answers on the final page.

1. Understand what the task asks

In an instruction, the verb often tells you what to do. Identify means locate information; explain means make an idea understandable; justify means support an answer with a specific reason or piece of evidence.

Example: 'Compare the two timetables and explain which route gets you there before 8:30.' You need to examine both options, choose one and give a reason. Copying a single time is not enough.

Before answering, identify three things: the action, its subject and any constraints. Here the subject is the route and the constraint is arrival before 8:30. Make a short list of what your answer must contain.

If a word remains unclear, restate the instruction in your own words or ask for clarification. This preparation helps you answer the actual question, even when you know many other things about the topic.

YOUR TURN

Task: 'Choose route A, arriving at 8:25, or B, arriving at 8:40, to be there before 8:30. Justify.' Write a complete answer.

2. Add fractions

A fraction describes a number. To add parts, express them using the same subdivision. One half and one quarter are not parts of the same size.

Write $1/2 = 2/4$. Then $1/2 + 1/4 = 2/4 + 1/4 = 3/4$. The denominator stays 4 because you are still counting quarters. Adding the denominators would change the size of the parts and would not solve the calculation.

To check, draw a rectangle divided into four equal areas. Two areas represent one half, and one area represents one quarter. Three out of four are coloured.

When denominators differ, find a common denominator and rewrite each fraction without changing its value. Multiply its numerator and denominator by the same non-zero number. Finish by simplifying if possible.

YOUR TURN

Calculate $2/3 + 1/6$. Show an intermediate step and explain why the answer is less than 1.

3. Recognise a proportion

In a proportional relationship, one quantity is obtained from the other by multiplying by the same number. If three identical notebooks cost six units, one notebook costs two units. Five then cost ten units, provided the price per notebook stays the same.

That condition matters. A deal with a fixed fee or discount may not follow the same relationship. Read the situation before using a proportion table.

The unit method means finding the value for one item, then multiplying by the required quantity. Include units at each stage to keep track of what the numbers mean.

You can check the scale of the answer: when a quantity doubles in a proportional relationship, the result doubles too. This can expose some errors, though it does not replace an exact calculation.

YOUR TURN

Four identical notebooks cost 10 units, with no discount or extra fee. What do 7 cost?

4. Check a piece of information

A post can be enjoyable to read and still lack evidence. Before repeating a claim, ask who made it, when it was published and what supports it.

Fictional example: 'This method doubles every pupil's results.' The sentence promises a precise, universal effect. To check it, you would need to know the method, the results measured, the people studied and the comparison used. A large number of shares does not answer those questions.

Next, look for the original source: the report, document or study cited. Check that it actually says what the post claims. A dramatic headline may oversimplify a cautious conclusion.

Use three columns in your notes: claim, available evidence and remaining question. If you cannot find enough evidence, write 'not verified'. That is different from 'false'; it describes the state of your checking.

YOUR TURN

Name three missing pieces of information in the fictional claim above.

5. Prepare a useful revision session

'Revise the chapter' is an intention. Turn it into a session by stating what you want to be able to do: explain an idea, solve a kind of calculation or compare two examples.

Choose a short section of your notes. After reading, close them and attempt an answer or exercise. Open the notes again to find differences. Record what was correct, what is missing and how to correct it.

If an error keeps returning, prepare a simpler example or ask for an explanation. Copying the same answer repeatedly without understanding the mistake can leave the difficulty unchanged.

Finish with a precise next step. 'Try another calculation with sixths' is easier to return to than 'revise maths'. Adapt the time to your circumstances and instructions. No study routine guarantees a grade; its purpose is to clarify what you are working on and what still needs explanation.

YOUR TURN

Turn 'revise fractions' into an observable goal and one checking exercise.

Answers and suggestions

1. Choose A: 8:25 is five minutes before 8:30. B arrives ten minutes after.
2. $\frac{2}{3} = \frac{4}{6}$; $\frac{4}{6} + \frac{1}{6} = \frac{5}{6}$. The numerator 5 is smaller than the denominator 6: another $\frac{1}{6}$ is needed to reach 1.
3. $10 \div 4 = 2.5$ units per notebook; $2.5 \times 7 = 17.5$ units.
4. Examples: definition of results, group studied, method, comparison, source and date. Any three relevant items are enough.
5. Example: 'Add two fractions with different denominators and explain the steps.' Check: calculate $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$ and explain the common denominator of 6.

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