

Algebraic language and substitution

Pearson Edexcel GCSE Mathematics 1MA1

L017 • Foundation and Higher

60 minute lesson | learner resources

The goal and the evidence

Connect & Check → Share → Present → Apply → Recall & Review

Read algebraic notation accurately. Substitute signed values and distinguish expressions, equations and identities.

Explain, apply and check independently.

Starting-point diagnostic

R1–R3 • Attempt without notes

Calculate $3 \times 4 + 2$.

Calculate $(-3)^2$.

Calculate $12 \div 3 + 1$.

Worked example and your turn

D1 • Explain each step

Model: $4a$ means $4 \times a$. For $a=3$, $4a=12$. Now evaluate $5b$ when $b=-2$.

Try the paired problem; check independently.

Worked example and your turn

D2 • Explain each step

Model: for $x=4$, $3x+2=3\times 4+2=14$. Now evaluate $3x+2$ for $x=-3$.

Try the paired problem; check independently.

Worked example and your turn

D3 • Explain each step

Model: $x = -2$ gives $x^2 = 4$ and $-x^2 = -4$. Now evaluate x^2 and $-x^2$ for $x = -3$.

Try the paired problem; check independently.

Worked example and your turn

D4 • Explain each step

Model: $2x+3$ is an expression; $2x+3=11$ is an equation. Classify $2(x+3)\equiv 2x+6$ and explain.

Try the paired problem; check independently.

A method you can explain

Name what changes at each step.

Check against the original question.

Diagnostic pause

Choose and explain before moving on.

For $x = -2$, x^2 is A -4 , B 4 , C -2 .

Use your explanation to decide the next step.

Careful variation

A1 • Show your reasoning

For $x=2$ then $x=-2$, evaluate $3x$, $x+3$ and x^2 . What changes when the sign changes?

Explain your decisions and check the result.

Independent application

A2 • Show your reasoning

Evaluate $2a - 3b$ for $a = -2$ and $b = 3$. Then evaluate ab .

Explain your decisions and check the result.

Use the method in context

A3 • Show your reasoning

A taxi cost is $C=4+2m$ pounds for m kilometres. Find C for $m=7$ and explain both terms.

Explain your decisions and check the result.

Intentional practice feedback

Read after attempting A3

£18. Fixed charge £4 and distance cost £14.

Correct one step and explain the change.

A claim to test

C1 • Show your reasoning

Is x^2 always equal to $2x$? Give a counterexample and a value where they agree.

Explain your decisions and check the result.

Deepen the reasoning

C2 • Show your reasoning

A learner says $a \div b = b \div a$. Test $a=6, b=3$, then explain why swapping the letters matters.

Explain your decisions and check the result.

Retrieval without notes

Q1–Q6 • Numeric answers; units as requested

Q1–Q3

$3x$ when $x=4$

$3x+2$ when $x=-3$

x^2 when $x=-3$

Q4–Q6

$-x^2$ when $x=-3$

$2a-b$ for $a=3, b=-2$

First share of 40 in ratio
3:5

Independent exit evidence

P1 • Without notes • Teacher review

Evaluate $4x - 1$ for $x = -2$. Show substitution. [2]

Show working and check your answer.

Independent exit evidence

P2 • Without notes • Teacher review

Evaluate $a^2 + 2b$ for $a = -3, b = 4$. Show substitution. [2]

Show working and check your answer.

Feedback and next steps

P3 • Completion is not mastery

Explain one error you have corrected.

Set a fresh question and a delayed check.

Before the next lesson

L018: Collect expand and factorise

Complete F1 tomorrow without notes.

Attempt F2 and bring one question.

Optional stretch

If $a = -2$ and $b = 5$, evaluate $3a^2 - 2b$ and $2(a+b)$.

Show a method. Explain a check or counterexample.

Optional deep challenge

A learner interprets $3x^2$ as $(3x)^2$. Use $x=2$ to expose the error.

Show a method. Explain a check or counterexample.

L017 Recall & Review



Algebraic language and substitution

Fresh evidence: prove the objective

Solve a new question without prompts. Explain one check, then correct one error in your working.

Objective: Read algebraic notation accurately. Substitute signed values and distinguish expressions, equations and identities.

Write the next practice step before you leave. It must test the method again, not simply copy today's example.

Feedback language

Use the full phrases before the abbreviations.



What Went Well (WWW)

I wrote the algebraic structure accurately and used a valid step-by-step method.

Point to the method, representation, reasoning or check that improved.

Even Better If (EBI)

I will show inverse operations clearly, keep signs/brackets accurate and substitute back to check.

Set one precise next-step action and test it on a fresh question.

Extension route



Choose this route only after the core evidence is secure.

Stretch

If $a = -2$ and $b = 5$, evaluate $3a^2 - 2b$ and $2(a + b)$.

Deep challenge

A learner interprets $3x^2$ as $(3x)^2$. Use $x = 2$ to expose the error.

Explain your reasoning clearly enough that another learner could check it.