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THE COMPLETE FREE WORKBOOK

Plan it. Check every step.

Eight problems. Sixty minutes. All
answers free.

Teach with a checked plan.

A timed algebra lesson / Worked answers and error analysis / Ten answer-key checks

EDITION 2.0 / SEPTEMBER 2026

A practical workbook, not a promise of results.

Inside the workbook

A complete free six-chapter lesson workbook with a sixty-minute algebra plan, eight original problems and worked solutions, a faulty-answer exercise, support-aware observations and ten checks. Fictional practice; no learner data or grade guarantees.

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How to use this workbook

A lesson plan is useful when the tutor can teach it, check every answer and decide what to do when the learner needs more support. This complete free workbook supplies a sixty-minute algebra lesson, eight original problems, worked solutions, a deliberately wrong AI answer and a small observation record. Every exercise and answer is included.

The learner L1 and all performance records are fictional. This is a tutor preparation exercise, not an assessment of a real child or a promise of improved grades. Kimi or another text assistant is optional for synthetic drafting. Do not upload learner identities, school records, diagnoses, private messages or photographs. The tutor owns the teaching decisions and checks the mathematics before use.

1. Choose one objective you can observe

The supplied starting point is a learner who can attempt one-step equations but sometimes reverses the wrong operation in a two-step equation. No grade, diagnosis, preferred learning style or formal curriculum placement is supplied. Do not infer one. The lesson objective is to solve selected two-step equations, explain the same operation on both sides and check a proposed solution by substitution.

The complete learner-facing problem packet is below. Keep the answer key separate while observing independent work. Here $x/3$ means x divided by 3, not 3 divided by x . Multiplication such as $2x$ means 2 times x .

ID	Stage	Problem
W1	Warm-up	$x + 4 = 11$
W2	Warm-up	$3x = 18$
G1	Guided example	$2x + 3 = 11$
G2	Guided example	$x/3 + 2 = 5$
I1	Independent practice	$3x - 4 = 11$
I2	Independent practice	$x/4 - 1 = 2$
E1	Exit check	$4x + 1 = 21$
E2	Exit check	$x/5 + 2 = 4$

Materials are paper or an approved writing surface, this problem packet and a separate tutor key. No app subscription is needed. Ask the learner to show intermediate lines rather than just a final number. An answer can be numerically correct without demonstrating the intended method.

Before teaching, check that the examples fit the learner's actual prerequisite knowledge and any agreed accommodations. This packet is not a universal age-level lesson. If the warm-up reveals an unresolved prerequisite, simplify the activity and record the change rather than forcing the original plan to finish.

2. Make the sixty minutes add up

The clock below is elapsed lesson time, not a calendar appointment. It includes all teaching activities; setup, breaks required for a particular learner and administrative work may need separate planning. Do not promise every learner will finish the same sequence.

Start minute	End minute	Activity	Evidence to collect
0	5	W1 and W2 warm-up	Unprompted steps and answers
5	15	Model G1 and discuss equality	Learner explains why subtract 3
15	30	Guided G2 and substitution checks	Record exact help provided
30	45	Error analysis and guided retry	Learner identifies the faulty line
45	55	I1 and I2 independent practice	Initial response before any hint
55	60	E1 and E2 exit check	Independent response and next step

The six blocks total 60 minutes: 5 + 10 + 15 + 15 + 10 + 5. If the learner needs a pause, record it and reduce the number of activities; do not squeeze an extra activity into the same minutes or pretend paused time was instruction.

Tutor script for G1: "Our equation says two times x , plus three, equals eleven. To undo the added three, subtract three from both sides. That leaves $2x = 8$. Divide both sides by two, giving $x = 4$. Now substitute four into the original equation: 2 times 4 plus 3 is 11. Both sides match. Which operation did we undo first, and why?"

For G2, model the intermediate line $x/3 = 3$ after subtracting two from both sides. Then multiply both sides by three to get $x = 9$. Ask the learner to explain why multiplying by three undoes division by three. Do not say to move a number across the equals sign and change it without explaining the operation.

3. Check all eight solutions before the lesson

The following is the complete tutor key. These are original practice problems, not copied assessment items. Substitution into the original equation is part of the check, not an optional decorative line.

ID	Intermediate step	Solution	Substitution check
W1	Subtract 4 from both sides	$x = 7$	$7 + 4 = 11$
W2	Divide both sides by 3	$x = 6$	3 times 6 = 18
G1	$2x = 8$	$x = 4$	2 times 4 + 3 = 11
G2	$x/3 = 3$	$x = 9$	$9/3 + 2 = 5$
I1	$3x = 15$	$x = 5$	3 times 5 - 4 = 11
I2	$x/4 = 3$	$x = 12$	$12/4 - 1 = 2$
E1	$4x = 20$	$x = 5$	4 times 5 + 1 = 21
E2	$x/5 = 2$	$x = 10$	$10/5 + 2 = 4$

The deliberately faulty draft says: " $2x + 3 = 11$, so $2x = 14$ and $x = 7$." Its first transformation is wrong: subtracting three gives eight, not fourteen. Substituting its proposed answer gives 2 times 7 + 3 = 17, which is not 11. Reject the draft and replace it with G1's checked solution.

Feedback draft: "Your division step follows from your previous line, but the previous line changed the equation incorrectly. Start again at $2x + 3 = 11$. What happens when we subtract three from both sides? Then check your final value in the original equation."

If a learner proposes a different valid sequence, check its equivalence rather than marking it wrong for not matching the tutor's exact order. For example, dividing all terms of G1 by two first can work, but every term must be divided. Mathematical validity and the chosen lesson method are related, not identical.

4. Record help separately from independent success

The fictional observation packet below is complete. Guided work is recorded as guided even when the final answer is correct. For I2, preserve the original attempt and note that the correct final answer came after a hint; do not rewrite it as independent success.

Item	Recorded final response	Support	Classification
W1	7	None	Independent correct
W2	6	None	Independent correct
G1	4	Tutor model	Guided correct
G2	9	Tutor model	Guided correct
I1	5	None	Independent correct
I2	Initial 4; final 12	Hint: undo subtracting 1 first	Prompted correct
E1	5	None	Independent correct
E2	8	None	Incorrect

I2's initial written line was $x/4 = 1$, leading to 4; after the hint, L1 corrected it to $x/4 = 3$ and then 12. The independent-practice pair has one independent correct response and one prompted correct response. The exit pair has one correct response out of two without help. That is 50% on this two-item exit check, not evidence of mastering algebra or a measured effect of AI tutoring.

Next-step note: "Revisit division-form equations. E2 was answered 8; the checked answer is 10. Ask L1 to subtract two from both sides, then explain the remaining division before multiplying. Use a fresh checked example later to see whether the method transfers without a hint."

Do not diagnose the reason for the error from this row alone. Ask the learner to explain their thinking. A single incorrect answer may reflect several different issues, and a correct answer on a practiced item does not prove success on a new one.

5. Use AI as a draft partner with a rejection test

Copy only the fictional problem packet, timing table and observation rows into Kimi or another approved text assistant. Ask for a tutor-facing draft, not a learner profile or automated decision.

Use only this synthetic lesson packet. Keep the total at 60 minutes.
Verify every equation by substitution. Identify the deliberately faulty G1 draft. Keep independent, guided and prompted results separate.
Return a lesson checklist and a short next-step note. Do not invent a diagnosis, age, curriculum level, grade improvement or learner identity.
Do not upload data elsewhere, send messages or claim a lesson occurred.

Reject an output that approves $x = 7$ for G1, calls I2 independent, promises mastery from the exit pair or adds activities without adjusting time. Review the actual generated draft line by line before adapting it. No model was executed or accuracy benchmark measured in this workbook.

Reusable lesson card: version; concept; observable objective; prerequisite evidence; original problem IDs; checked key; timed activities; support provided; independent responses; learner explanation; next-step decision; reviewer; review date. Save the previous version when changing the tasks so later comparisons have a traceable basis.

For an actual learner, keep sensitive records in the approved restricted system and use your organization's consent and safeguarding process. A shortened identifier is not a guarantee of anonymity if other details can identify the person. This practice deliberately needs no real child data.

6. Check the complete answer key

1. **Objective:** Solve the supplied two-step equations, explain equality-preserving operations and check by substitution; no grade outcome is promised.
2. **Timing:** $5 + 10 + 15 + 15 + 10 + 5 = 60$ minutes, with no overlapping blocks.
3. **Warm-up answers:** W1 is 7; W2 is 6.
4. **Guided answers:** G1 is 4; G2 is 9.
5. **Practice answers:** I1 is 5; I2 is 12.
6. **Exit answers:** E1 is 5; E2 is 10.
7. **Faulty draft:** $2x = 14$ is the first wrong line; substituting 7 gives 17, not 11.
8. **Support distinction:** I2 is prompted correct, while G1 and G2 are guided correct; none is independent evidence.
9. **Exit result:** One of two correct without help, or 50% on this tiny check; no mastery or causal improvement claim.

10. **Next action:** Review the division-form method with fresh checked examples and preserve the observed support level and original responses.

The lesson, eight problems, complete solutions, scripts, prompt and ten checks remain free. The related member workbooks cover scheduling, online setup, parent communication and ethical offer measurement; they are optional continuations, not withheld parts of this lesson.

Sources and boundaries

- [OpenStax: general strategy for linear equations](#) supports checking equality-preserving steps and substituting a proposed solution. The eight problems and observation records here are original.
- [Education Endowment Foundation: feedback](#) discusses task-focused, actionable feedback. It does not validate this fictional lesson or promise an individual learner outcome.

Reviewed September 17, 2026. This is a preparation workbook, not a clinical assessment, accredited curriculum, automated tutor or account of actual teaching. Adapt with professional judgment and appropriate permissions.