

ALGEBRA ERROR ANALYSIS ACTIVITY SET

Grades 8–10 | Premium Secondary Math Resource

This premium algebra resource develops mathematical reasoning, error detection skills, and deeper conceptual understanding through structured error analysis activities.

Students analyze incorrect algebra solutions, identify mistakes, explain misconceptions, and rewrite complete correct solutions.

The activities are intentionally designed at an appropriate middle-to-secondary level for Grades 8–10 — rigorous without becoming unnecessarily advanced.

RESOURCE FEATURES	INCLUDED
40 Algebra Error Analysis Tasks	YES
Student Recording Sheets	YES
Detailed Teacher Answer Key	YES
Mathematical Error Explanations	YES
Discussion Sentence Frames	YES
Reflection Pages	YES

Professional Print Layout	YES
---------------------------	-----

Teacher Introduction

Error analysis is one of the most effective instructional strategies for strengthening algebraic understanding.

Instead of only practicing correct procedures, students examine incorrect mathematical reasoning and determine:

- where the mistake occurred
- why the reasoning is incorrect
- how to correct the process
- how to avoid similar mistakes in the future

This process builds:

- mathematical reasoning
- precision and accuracy
- metacognitive thinking
- academic discussion skills
- confidence with algebra

Suggested Classroom Uses

- Bell ringers
- Math stations
- Partner discussion tasks
- Intervention groups
- Homework review
- Exit tickets
- Test preparation
- Spiral review

Student Directions

For each problem:

1. Read the incorrect solution carefully.
2. Identify the exact mathematical mistake.
3. Explain why the reasoning is incorrect.
4. Rewrite the correct solution.
5. Check your work carefully.

Discussion Sentence Frames

- The mistake happened because...
- This step is incorrect since...
- The student should have...
- A better strategy would be...
- The variable was isolated incorrectly because...
- The distributive property was used incorrectly because...
- The exponent rule was applied incorrectly because...
- The correct answer should be...

Student Activity Pages

Students must carefully analyze each incorrect algebra solution, identify the mathematical error, explain the misconception, and rewrite the complete correct solution.

Problem 1 One-Step Equations	
Question: Solve: $x + 7 = 18$	
Incorrect Student Work: $x + 7 = 18$ $x = 18 + 7$ $x = 25$	
Find the Mistake	
Explain Why It Is Incorrect	
Write the Correct Solution	

Problem 2 One-Step Equations	
Question: Solve: $5x = 35$	

Incorrect Student Work: $5x = 35$ $x = 35 - 5$ $x = 30$	
Find the Mistake	
Explain Why It Is Incorrect	
Write the Correct Solution	

Problem 3 Two-Step Equations	
Question: Solve: $2x + 5 = 19$	
Incorrect Student Work: $2x + 5 = 19$ $2x = 19 + 5$ $2x = 24$ $x = 12$	
Find the Mistake	
Explain Why It Is Incorrect	

Write the Correct Solution	
----------------------------	--

Problem 4 Two-Step Equations

Question:

Solve: $4x - 3 = 21$

Incorrect Student Work:

$$4x - 3 = 21$$

$$4x = 21 - 3$$

$$4x = 18$$

$$x = 4.5$$

Find the Mistake

Explain Why It Is Incorrect

Write the Correct Solution

Problem 5 Variables on Both Sides

Question:

Solve: $3x + 4 = x + 14$

Student Reflection Pages

Reflection activities help students think more deeply about mathematical reasoning, common misconceptions, and strategies for improving algebra skills.

Reflection: Understanding Mistakes

- 1 Which algebra problem was easiest for you to analyze?
- 2 Which problem was the most challenging and why?
- 3 What type of mistake appeared most often?
- 4 How can checking work help prevent algebra mistakes?
- 5 What strategies help you solve equations more accurately?

Student Reflection Notes

Growth Mindset Reflection

Mistakes are an important part of learning mathematics. Strong mathematicians examine their reasoning carefully, revise incorrect thinking, and continue improving.

- Describe a mistake that helped you learn something new.
- How did correcting errors improve your confidence?
- What algebra skill would you like to improve further?
- What advice would you give another student about checking work?

My Algebra Growth Reflection

Teacher Answer Key & Error Explanations

Each answer key entry includes:

- The mathematical mistake
- Why the reasoning is incorrect
- The correct solution process

Problem 1 — Teacher Answer Key

Mistake:

The student added 7 instead of subtracting 7.

Explanation:

To isolate x , subtract 7 from both sides.

Correct Solution:

$$x + 7 = 18$$

$$x = 18 - 7$$

$$x = 11$$

Problem 2 — Teacher Answer Key

Mistake:

The student subtracted instead of dividing by 5.

Explanation:

When a variable is multiplied by a number, divide both sides by that number.

Correct Solution:

$$5x = 35$$

$$x = 35 \div 5$$

$$x = 7$$

Problem 3 — Teacher Answer Key

Problem 14 — Teacher Answer Key

Mistake:

The student added instead of subtracting.

Explanation:

Use inverse operations carefully.

Correct Solution:

$$x/5 + 2 = 7$$

$$x/5 = 5$$

$$x = 25$$

Problem 15 — Teacher Answer Key

Mistake:

The student incorrectly combined positive and negative integers.

Explanation:

Evaluate integer operations carefully step-by-step.

Correct Solution:

$$-4 + 9 - 3$$

$$= 5 - 3$$

$$= 2$$

Problem 16 — Teacher Answer Key

Mistake:

The student ignored the rule for multiplying two negatives.

Explanation:

A negative times a negative equals a positive.

Correct Solution:

$$\begin{aligned} & -6(-2) \\ & = 12 \end{aligned}$$

Problem 17 — Teacher Answer Key**Mistake:**

The subtraction order was inconsistent.

Explanation:

Slope calculations must use consistent subtraction order.

Correct Solution:

$$\begin{aligned} m &= (11 - 3) / (6 - 2) \\ &= 8 / 4 \\ &= 2 \end{aligned}$$

Problem 18 — Teacher Answer Key**Mistake:**

The student added x-values instead of subtracting them.

Explanation:

Slope uses change in y divided by change in x.

Correct Solution:

$$\begin{aligned} m &= (8 - 5) / (4 - 1) \\ &= 3 / 3 \\ &= 1 \end{aligned}$$

Problem 19 — Teacher Answer Key

Mistake:

The student added rise and run instead of dividing.

Explanation:

Slope is rise divided by run.

Correct Solution:

$$\begin{aligned}\text{slope} &= 6 / 3 \\ &= 2\end{aligned}$$

Problem 20 — Teacher Answer Key

Mistake:

The student confused the slope with the y-intercept.

Explanation:

In slope-intercept form, the coefficient of x is the slope.

Correct Solution:

$$\begin{aligned}y &= 4x + 7 \\ \text{slope} &= 4\end{aligned}$$

Problem 21 — Teacher Answer Key

Mistake:

The student stopped before solving completely.

Explanation:

After setting equations equal, continue solving for x.

Correct Solution:

$$\begin{aligned}x + 2 &= 2x - 1 \\ x &= 3 \\ y &= 5 \\ \text{Solution: } &(3, 5)\end{aligned}$$

Problem 22 — Teacher Answer Key

Mistake:

The student solved $2x = 14$ incorrectly.

Explanation:

Divide both sides by 2.

Correct Solution:

$$2x = 14$$

$$x = 7$$

Problem 23 — Teacher Answer Key

Mistake:

The student divided incorrectly after simplifying.

Explanation:

After simplifying to $2x = 8$, divide correctly.

Correct Solution:

$$2x = 8$$

$$x = 4$$

$$y = 13$$

Solution: (4, 13)

Problem 24 — Teacher Answer Key

Mistake:

The exponents were multiplied instead of added.

Explanation:

When multiplying like bases, add exponents.

Correct Solution:

$$2^3 \times 2^2$$

$$= 2^5$$

$$= 32$$

Problem 25 — Teacher Answer Key**Mistake:**

The student evaluated 3^4 incorrectly.

Explanation:

3 multiplied by itself four times equals 81.

Correct Solution:

$$(3^2)^2$$

$$= 3^4$$

$$= 81$$

Problem 26 — Teacher Answer Key**Mistake:**

The student combined bases incorrectly.

Explanation:

Evaluate exponents separately first.

Correct Solution:

$$5^2 + 3^2$$

$$= 25 + 9$$

$$= 34$$

Problem 27 — Teacher Answer Key

Mistake:

The exponent sign is incorrect.

Explanation:

Moving the decimal to the right creates a negative exponent.

Correct Solution:

$$\begin{aligned} &0.00045 \\ &= 4.5 \times 10^{-4} \end{aligned}$$

Problem 28 — Teacher Answer Key

Mistake:

The student substituted incorrectly.

Explanation:

Replace x with 4 only.

Correct Solution:

$$\begin{aligned} f(4) &= 2(4) + 3 \\ &= 11 \end{aligned}$$

Problem 29 — Teacher Answer Key

Mistake:

The student evaluated 3^2 incorrectly.

Explanation:

3 squared equals 9.

Correct Solution:

$$\begin{aligned} g(3) &= 3^2 - 1 \\ &= 9 - 1 \\ &= 8 \end{aligned}$$