Accelerated 7 • Unit 4 • Assessment Guide

Expressions and More Equations

For the Parent or Teacher — What to look for

Unit 4 develops the central algebraic move: combining like terms, manipulating equivalent expressions, and recognizing when equations have one, no, or infinite solutions. This is direct preparation for Algebra 1 — watch for STRUCTURAL thinking (seeing the form before computing).

Problem 1 — Equivalence checks

- (a) $3(x-2) + 4 = 3x - 6 + 4 = 3x - 2$. So they ARE equivalent. Strong students will catch this when they expand carefully.
- (b) Equivalent: $2x + 3x - 5 = 5x - 5 = 5(x - 1)$.
- (c) Equivalent: $-(x - 4) = -x + 4 = 4 - x$.
- Diagnostic: distribute and combine; (a) catches sloppy distribution.

Problem 2 — Factoring

- (a) $6(2x + 3)$.
- (b) $-5(2x - 5)$ OR $5(-2x + 5)$. Sign management matters.
- (c) $3x(2x - 3)$.
- Strong students factor out the LARGEST common factor (e.g., not $2(6x + 9)$ for part a).

Problem 3 — Variables on both sides

- (a) $5x - 2x = 19 - 7$ -> $3x = 12$ -> $x = 4$.
- (b) $3x - 3 = 2x + 5$ -> $x = 8$.
- (c) $4 - 25 = 5x + 2x$ -> $-21 = 7x$ -> $x = -3$.
- Watch for sign errors when moving terms across the equal sign.

Problem 4 — One, none, infinite

- (a) Infinitely many: $4x + 8 = 4x + 8$ (both sides identical).
- (b) No solution: $3x + 5 \neq 3x - 2$ (left always 7 more than right).
- (c) One solution: $2x + 6 = 4x + 6$ -> $2x = 0$ -> $x = 0$.
- Strong: classifies WITHOUT necessarily completing the solve, by recognizing structure (same x coefficient -> no unique solution; different coefficients -> unique).
- Weak: solves them all and is surprised by $0 = 0$ or $0 \neq 0$.

Problem 5 — Design equations

- (a) Many: $x = 7$, or $2x - 3 = 11$. Stronger if uses variables on both sides: $3x + 4 = 2x + 11$.
- (b) Any of form $ax + b = ax + c$ with $b \neq c$. E.g., $2x + 1 = 2x + 5$.
- (c) Any identity. E.g., $3(x + 2) = 3x + 6$.
- Strong responses use the structural insight: matching coefficients on x with different constants -> no solution; matching everything -> infinite; different x coefficients -> one solution.

Problem 6 — Age problem

- Let L = Lin's age now. Mai = L + 3. In 7 years, Mai = L + 10. Lin 4 years ago = L - 4. Equation: $L + 10 = 2(L - 4)$ -> $L + 10 = 2L - 8$ -> $L = 18$.

- So Lin = 18, Mai = 21.
- Setup is the hard part. Check that they correctly handle "in 7 years" (+7) vs "4 years ago" (-4).

Problem 7 — Two tanks

- 200 - 8t = 50 + 4t -> 150 = 12t -> t = 12.5 minutes.
- Amount in each: 200 - 8(12.5) = 100 L. Check: 50 + 4(12.5) = 100.
- Strong: writes BOTH amounts as expressions in t. Weak: works numerically by guess-and-check.

Problem 8 — Meaning of 0=5 and 0=0

- Both students are right.
- 0 = 5 means: the original equation is FALSE for every value of x. No solution.
- 0 = 0 means: the original equation is TRUE for every value of x. All real numbers are solutions.
- Best answers explain that the variable canceled out, leaving a statement that's either always-false or always-true. This shows understanding of what "solve" means.

Problem 9 — Structural analysis

- Expand: 7(x + 3) - 5 = 7x + 21 - 5 = 7x + 16. So LHS = RHS for all x. Infinitely many solutions.
- Strong: notes that BOTH sides simplify to 7x + 16 BEFORE solving. This is structure-spotting — the Algebra 1 skill.

Problem 10 — Distribution error

- Andre is right: 2(3x - 4) = 6x - 8.
- Mai's error: forgot to distribute the 2 to the -4 (only multiplied 2*3x).
- Common error throughout the course. Strong response names "failure to distribute the second term."

Problem 11 — Find c

- Infinitely many: c = 4 (since 3(x+4) = 3x+12).
- No solution: ANY c ≠ 4. E.g., c = 5 gives 3x + 15 = 3x + 12, no solution.
- One solution: impossible with this structure (both sides have the same x coefficient -> either no solution or infinite).
- Strong: realizes that ONE solution is IMPOSSIBLE here — the coefficient of x is forced to be 3 on both sides. That recognition is what Algebra 1 is built on.

— end —