



Adding & subtracting linear expressions

GRADE 7 MATH

Answer keys for the exit ticket, practice worksheet, and homework, plus notes for the lesson slides. Each answer shows the steps and the most likely wrong answer ("If wrong"), so you can tell what a mistake means, not just that it is one. Questions go from **fluency** to **application** to **reasoning**.

Exit Ticket — answer key

Use: End of the add/subtract expressions lesson. 5–8 min, independent. Items 1 and 2 use the same two expressions so the difference is entirely the operation.

Timing: 5–8 min · independent. An answer of $2x - 2$ on item 2 is the distributed-minus error and is the single thing to reteach.

1. $(5x + 2) + (3x - 4)$? **FLUENCY**

Answer: $8x - 2$

1. The bracket is being added, so nothing changes inside.
2. x terms: $5x + 3x = 8x$. Constants: $2 + (-4) = -2$.
3. Answer $8x - 2$.

If wrong: Combined $8x$ and -2 into $6x$. Unlike terms cannot be added — $8x$ and -2 stay separate.

2. $(5x + 2) - (3x - 4)$? **APPLICATION**

Answer: $2x + 6$

1. Rewrite as adding the opposite: $(5x + 2) + (-3x + 4)$.
2. Note BOTH signs flipped: $3x$ became $-3x$ and -4 became $+4$.
3. x terms: $5x - 3x = 2x$. Constants: $2 + 4 = 6$.
4. Answer $2x + 6$.

If wrong: Answered $2x - 2$ by subtracting $3x$ and then carrying -4 across unchanged. The minus applies to every term inside the bracket, not just the first.

3. $(7x - 1) - (2x + 5)$? APPLICATION

Answer: $5x - 6$

1. Rewrite: $(7x - 1) + (-2x - 5)$. Both signs inside flipped.
2. x terms: $7x - 2x = 5x$. Constants: $-1 - 5 = -6$.
3. Answer $5x - 6$.

If wrong: Answered $5x + 4$ by flipping only the $2x$ and leaving $+5$ alone.

4. Check question 2 at $x = 1$ REASONING

Answer: **Both give 8, which shows the two expressions agree at $x = 1$**

1. Original: $(5(1) + 2) - (3(1) - 4) = 7 - (-1) = 8$.
2. Simplified: $2(1) + 6 = 8$. They match.
3. What it proves: the two expressions agree AT $x = 1$. That is strong evidence, not proof — the wrong answer $2x - 2$ gives 0 at $x = 1$, so this check does catch it.
4. To be confident, test a second value. At $x = 0$ the original gives $2 - (-4) = 6$ and the simplified gives 6, while $2x - 2$ would give -2 .
5. Two agreeing values make an error very unlikely for linear expressions, because two points determine a line.

If wrong: Said the check proves the answer is right for all x . One substitution can only rule out a wrong answer, not confirm a right one — though for linear expressions, two do.

Quick answers for fast checking:

#	Level	Answer
1	fluency	$8x - 2$
2	application	$2x + 6$
3	application	$5x - 6$
4	reasoning	both give 8

Practice Worksheet — answer key

Use: During the lesson after the deck. Items 3 and 4 are a matched pair; item 5 makes students name where the $+7$ came from, which is where the error lives.

Timing: 15–25 min · pairs or independent · circulate on 5 and 9. Require the flipped-sign line written out on every subtraction, even when students think they can do it mentally.

1. $(4x + 3) + (2x + 5)$? FLUENCY

Answer: $6x + 8$

1. $4x + 2x = 6x$; $3 + 5 = 8$.

If wrong: Answered $14x$ by combining unlike terms.

2. $(4x + 3) - (2x + 5)$? FLUENCY

Answer: $2x - 2$

1. Flip inside: $(4x + 3) + (-2x - 5)$.

2. $4x - 2x = 2x$; $3 - 5 = -2$.

If wrong: Answered $2x + 8$ by leaving the $+5$ unflipped.

3. $(6x - 2) + (x - 7)$? FLUENCY

Answer: $7x - 9$

1. $6x + x = 7x$; $-2 + (-7) = -9$.

2. Remember x means $1x$.

If wrong: Answered $6x - 9$, dropping the lone x .

4. $(6x - 2) - (x - 7)$? APPLICATION

Answer: $5x + 5$

1. Flip inside: $(6x - 2) + (-x + 7)$.

2. $6x - x = 5x$; $-2 + 7 = 5$.

If wrong: Answered $5x - 9$ by carrying -7 across unchanged.

5. Where did the +7 come from? REASONING

Answer: **From subtracting -7 , which adds 7**

1. The second bracket ends in -7 , and the whole bracket is being subtracted.
2. Subtracting -7 is the same as adding 7 — the same rule as NS-01.
3. So the constant goes $-2 + 7 = 5$, not $-2 - 7 = -9$.
4. This is exactly why rewriting as ‘adding the opposite’ is worth the extra line: it makes the +7 visible instead of something you must remember.

If wrong: Said the 7 was copied from the bracket. It changed sign on the way out, and that change is the whole point.

6. $(\frac{2}{3}x + 1) + (\frac{1}{3}x - 4)$? APPLICATION

Answer: **$x - 3$**

1. $\frac{2}{3}x + \frac{1}{3}x = \frac{3}{3}x = x$.
2. $1 + (-4) = -3$.
3. Answer $x - 3$ — the coefficient is exactly 1, so write x rather than $1x$.

If wrong: Added the denominators to get $\frac{2}{6}x$. Add the numerators over the common denominator.

7. $(5x + 1) - (5x + 1)$? APPLICATION

Answer: **0**

1. Flip inside: $(5x + 1) + (-5x - 1)$.
2. $5x - 5x = 0$; $1 - 1 = 0$.
3. Answer 0. Anything minus itself is zero, whatever x is.

If wrong: Answered $10x + 2$ by adding instead of subtracting.

8. Original at $x = 2$? APPLICATION

Answer: **15**

1. $(6(2) - 2) - (2 - 7) = (12 - 2) - (-5) = 10 + 5 = 15$.

If wrong: Got 5 by mishandling the $-(-5)$.

9. Simplified at $x = 2$ — match? REASONING

Answer: $5(2) + 5 = 15$, so yes

1. Simplified: $5x + 5$ at $x = 2$ gives $10 + 5 = 15$.
2. Original also gave 15, so they match.
3. If they did NOT match, the simplification would be wrong — a correct simplification must give the same value for EVERY x , since it is the same expression written differently.
4. A mismatch tells you there is an error but not where it is; you would go back and re-check each sign flip.
5. Note the common wrong answer $5x - 9$ gives 1 at $x = 2$, so this check catches it.

If wrong: Said a mismatch would mean $x = 2$ is not allowed. Every value of x is allowed; a mismatch means the algebra is wrong.

Quick answers for fast checking:

#	Level	Answer
1	fluency	$6x + 8$
2	fluency	$2x - 2$
3	fluency	$7x - 9$
4	application	$5x + 5$
5	reasoning	subtracting -7 adds 7
6	application	$x - 3$
7	application	0
8	application	15
9	reasoning	yes, both 15

Homework — answer key

Use: Parallels the practice sheet. Item 8 is the subtlest thing in the batch: the check passes but tests less than it appears to, because one bracket evaluates to zero.

Timing: ~15 min at home · independent · review item 8 as the next-day warm-up. Choosing a good check value is a habit worth naming.

1. $(8x + 5) + (3x - 2)$? FLUENCY

Answer: $11x + 3$

1. $8x + 3x = 11x$; $5 - 2 = 3$.

If wrong: Answered $14x$.

2. $(8x + 5) - (3x - 2)$? FLUENCY

Answer: $5x + 7$

1. Flip inside: $(8x + 5) + (-3x + 2)$.

2. $8x - 3x = 5x$; $5 + 2 = 7$.

If wrong: Answered $5x + 3$ by carrying -2 across unchanged.

3. $(9x - 4) + (2x - 6)$? FLUENCY

Answer: $11x - 10$

1. $9x + 2x = 11x$; $-4 - 6 = -10$.

If wrong: Answered $11x - 2$.

4. $(9x - 4) - (2x - 6)$? APPLICATION

Answer: $7x + 2$

1. Flip inside: $(9x - 4) + (-2x + 6)$.

2. $9x - 2x = 7x$; $-4 + 6 = 2$.

If wrong: Answered $7x - 10$ by carrying -6 unchanged.

5. $(\frac{1}{2}x - 3) + (\frac{1}{2}x + 3)$? APPLICATION

Answer: x

1. $\frac{1}{2}x + \frac{1}{2}x = x$; $-3 + 3 = 0$.

2. Answer x , since adding 0 changes nothing.

If wrong: Wrote $x + 0$. Correct but unfinished — drop the $+0$.

6. $(3x + 7) - (3x - 7)$? APPLICATION

Answer: **14**

1. Flip inside: $(3x + 7) + (-3x + 7)$.
2. $3x - 3x = 0$; $7 + 7 = 14$.
3. Answer 14.

If wrong: Answered 0 by cancelling the constants as well as the x terms. The constants do not cancel — one flipped sign and one did not.

7. Why is an answer with no x correct? REASONING

Answer: **Because the x terms cancelled — the difference does not depend on x**

1. $3x - 3x = 0$, so the x terms vanish.
2. That is not an error; it means the two expressions differ by the same amount whatever x is.
3. Test it: at $x = 0$ the original is $7 - (-7) = 14$. At $x = 5$ it is $22 - 8 = 14$. Same answer.
4. So the expression is CONSTANT — a perfectly good linear expression with a coefficient of zero on x.

If wrong: Assumed a missing x means a lost term. Cancelling to zero is a result, not an omission — the substitution check confirms it.

8. Check question 4 at $x = 3$ REASONING

Answer: **Both give 23**

1. Original: $(9(3) - 4) - (2(3) - 6) = (27 - 4) - (6 - 6) = 23 - 0 = 23$.
2. Simplified: $7(3) + 2 = 21 + 2 = 23$. They match.
3. Note the second bracket happens to be 0 here, which makes this a weak test — it would not catch an error in how the -6 was handled.
4. A better check value is one where neither bracket vanishes, such as $x = 1$: original gives $5 - (-4) = 9$, simplified gives 9.
5. Choosing the check value matters; a value that makes part of the expression disappear tests less than you think.

If wrong: Matched at $x = 3$ and concluded the answer must be right. Here the second bracket is zero, so the check is weaker than it looks.

Quick answers for fast checking:

#	Level	Answer
1	fluency	$11x + 3$

2	fluency	$5x + 7$
3	fluency	$11x - 10$
4	application	$7x + 2$
5	application	x
6	application	14
7	reasoning	x terms cancelled
8	reasoning	both 23, but a weak check

Lesson slides — teaching notes & timing

Mini-lesson deck: ~12–15 min, then the practice sheet. Opens G7 Expressions & Equations. Uses the ‘adding the opposite’ idea from NS-01, now applied to a whole bracket.

Slide	~Time	Note
1/8	0:00	Frame it: adding expressions is collecting. Subtracting is where marks are lost.
2/8	1:00	Hook — poll the two answers. Do NOT resolve. $2x - 2$ usually wins the room.
3/8	2:30	Do the addition first so the contrast on the next slide is sharp.
4/8	4:30	WE1 — resolve the hook. Write the flipped line as a separate step and insist students copy that habit.
5/8	7:00	WE2 — name the error precisely: the minus stopped at the first term. Naming it helps students catch themselves.
6/8	9:00	CFU — all-student response. $5x - 6$. Watch for $5x + 4$, which flipped only the $2x$.
7/8	11:00	The substitution check, including how to choose a value. $x = 0$ is tempting and often tests too little.
8/8	13:30	Launch the in-class practice sheet.