



Combining like terms

GRADE 6 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 like-terms lesson. 5–8 min, independent.

Timing: 5–8 min · independent. Item 4 is the core check; substitution proves it rather than asserting it.

1. $3x + 5x$? **FLUENCY**

Answer: $8x$

1. Both terms count x’s, so they are like terms.
2. 3 x’s plus 5 x’s is 8 x’s: $8x$.

If wrong: Answered $8x^2$ — added the coefficients AND multiplied the variables. Adding like terms never changes the variable part.

2. $x + 4x$? **APPLICATION**

Answer: $5x$

1. A bare x means $1x$.
2. $1x + 4x = 5x$.

If wrong: Answered $4x$ — treated the lone x as nothing. Every variable has an invisible coefficient of 1.

3. $2x + 7 + 3x$? **APPLICATION**

Answer: $5x + 7$

1. Group the like terms: $2x$ and $3x$.
2. $2x + 3x = 5x$. The 7 has no like partner.
3. $5x + 7$.

If wrong: Answered $12x$ — swept the 7 in with the x terms.

4. Is $3x + 2 = 5x$? REASONING

Answer: **No** — at $x = 4$, $3x + 2 = 14$ but $5x = 20$

- $3(4) + 2 = 12 + 2 = 14$.
- $5(4) = 20$. Different, so they are not equivalent.
- $3x$ counts x 's and 2 counts units — you cannot add them, just like you cannot add 3 apples and 2 oranges into 5 apples.

If wrong: Combined them anyway because both are 'just numbers in the expression.' Terms combine only when the variable part matches exactly.

Quick answers for fast checking:

#	Level	Answer
1	fluency	$8x$
2	application	$5x$
3	application	$5x + 7$
4	reasoning	No — 14 vs 20

Practice Worksheet — answer key

Use: During the lesson after the mini-lesson/deck. Item 7 corrects the belief that a simplified expression must collapse to a single term.

Timing: 15–25 min · pairs or independent · circulate on 7–9. Items 1–3 fluency, 4–6 application, 7–9 reasoning. Item 8 requires expanding before combining — order matters.

1. $4a + 6a$? FLUENCY

Answer: **$10a$**

- Same variable part: $4 + 6 = 10$ a 's.

If wrong: Answered $10a^2$.

2. $9y - 3y$? FLUENCY

Answer: **$6y$**

- $9 - 3 = 6$ y 's.

If wrong: Answered 6 — dropped the variable.

3. $n + 7n$? FLUENCY

Answer: $8n$

1. n is $1n$, so $1 + 7 = 8$.

If wrong: Answered $7n$ — ignored the lone n .

4. $5x + 3 + 2x$? APPLICATION

Answer: $7x + 3$

1. Like terms: $5x$ and $2x \rightarrow 7x$.
2. The 3 stands alone. $7x + 3$.

If wrong: Answered $10x$ — pulled the 3 into the x terms.

5. $8m + 4 - 3m$? APPLICATION

Answer: $5m + 4$

1. $8m - 3m = 5m$; the 4 stays.
2. $5m + 4$.

If wrong: Answered $9m$ — subtracted $3m$ from the 4, or combined everything.

6. $6 + 2k + 9$? APPLICATION

Answer: $2k + 15$

1. The constants 6 and 9 are like terms: 15.
2. $2k$ has no partner. $2k + 15$.

If wrong: Answered $17k$ — treated every number as a k term.

7. Can $4x + 9$ be simplified? REASONING

Answer: **No** — $4x$ and 9 are not like terms

1. $4x$ counts x 's; 9 counts units.
2. Their variable parts differ, so they cannot be combined.
3. The expression is already in simplest form.

If wrong: Answered $13x$. 'Simplify' does not mean 'end with one term' — sometimes the simplest form has two.

8. $2(x + 3) + 4x$? REASONING

Answer: $6x + 6$

1. Expand first: $2(x + 3) = 2x + 6$.
2. Now $2x + 6 + 4x$.
3. Combine like terms: $2x + 4x = 6x$, so $6x + 6$.

If wrong: Combined before expanding, or distributed to the first term only ($2x + 3 + 4x = 6x + 3$).

9. $7p + 2p - 5p$, checked at $p = 3$? REASONING

Answer: $4p$; both give 12

1. $7p + 2p = 9p$; $9p - 5p = 4p$.
2. Original at $p = 3$: $21 + 6 - 15 = 12$.
3. Result at $p = 3$: $4(3) = 12$. They match, so the simplification is correct.

If wrong: Simplified correctly but skipped the check, or evaluated only one side so the check proved nothing.

Quick answers for fast checking:

#	Level	Answer
1	fluency	$10a$
2	fluency	$6y$
3	fluency	$8n$
4	application	$7x + 3$
5	application	$5m + 4$
6	application	$2k + 15$
7	reasoning	No — already simplest
8	reasoning	$6x + 6$
9	reasoning	$4p$; both 12

Homework — answer key

Use: Parallels the practice sheet. Item 4's answer ($8x + 8$) is deliberately chosen so the matching numbers tempt a further, invalid combination.

Timing: ~15 min at home · independent · review item 8 as the next-day warm-up; the check catches the dropped lone t.

1. $5b + 2b$? FLUENCYAnswer: **$7b$** 1. $5 + 2 = 7$ b's.**If wrong:** Answered $7b^2$.**2. $10c - 4c$? FLUENCY**Answer: **$6c$** 1. $10 - 4 = 6$ c's.**If wrong:** Answered 6 — dropped the variable.**3. $y + 9y$? FLUENCY**Answer: **$10y$** 1. y is $1y$, so $1 + 9 = 10$.**If wrong:** Answered $9y$.**4. $3x + 8 + 5x$? APPLICATION**Answer: **$8x + 8$** 1. $3x + 5x = 8x$; the 8 stays.2. $8x + 8$. (These look alike but mean different things — 8 x's plus 8 units.)**If wrong:** Answered $16x$ — combined the constant with the x terms.**5. $12n + 5 - 7n$? APPLICATION**Answer: **$5n + 5$** 1. $12n - 7n = 5n$; the 5 stays.2. $5n + 5$.**If wrong:** Answered $10n$.

6. Can $6x + 7$ be simplified? APPLICATION

Answer: **No — not like terms**

1. $6x$ counts x 's; 7 counts units.
2. Different variable parts cannot be combined; it is already simplest.

If wrong: Answered $13x$.

7. $3(x + 2) + 2x$? REASONING

Answer: **$5x + 6$**

1. Expand: $3(x + 2) = 3x + 6$.
2. Now $3x + 6 + 2x$.
3. $3x + 2x = 5x$, so $5x + 6$.

If wrong: Distributed to the first term only, or combined the $2x$ inside the parentheses before expanding.

8. $9t - 2t + t$ at $t = 5$? REASONING

Answer: **$8t$; both give 40**

1. $9t - 2t = 7t$; $7t + t = 7t + 1t = 8t$.
2. Original at $t = 5$: $45 - 10 + 5 = 40$.
3. Result: $8(5) = 40$. Match confirms the simplification.

If wrong: Answered $7t$ by ignoring the final lone t , which the substitution check would have caught ($35 \neq 40$).

Quick answers for fast checking:

#	Level	Answer
1	fluency	$7b$
2	fluency	$6c$
3	fluency	$10y$
4	application	$8x + 8$
5	application	$5n + 5$
6	application	No — already simplest
7	reasoning	$5x + 6$
8	reasoning	$8t$; both 40

Lesson slides — teaching notes & timing

Mini-lesson deck: ~12–15 min, then launch into the practice sheet. Slide numbers match the deck.

Slide	~Time	Note
1/8	0:00	Frame the skill: combining is allowed only when the variable parts match.
2/8	1:00	Hook — poll yes/no. Do NOT resolve. Combining unlike terms is the dominant error in this skill.
3/8	3:00	Define like terms. The apples/oranges analogy works, but follow it with the substitution proof on the next slide — analogy alone is not evidence.
4/8	5:00	WE1 — resolve the hook by substitution. Emphasise that a two-term answer can be fully simplified.
5/8	7:00	WE2 — the invisible coefficient. Write $1x$ above the bare x explicitly.
6/8	9:00	CFU — all-student response. Answer $5x + 7$. Watch for $12x$.
7/8	11:00	Order of moves: expand, then combine. This previews the multi-step work in the equations skills.
8/8	13:00	Launch the in-class practice sheet.