

Name _____

Date _____

2.3 Collecting like terms — worksheet

Collect like terms to simplify an algebraic expression. · 56 questions · Show your working.

Remember

- **Like terms** contain exactly the same letters to the same powers.
- Only like terms can be combined: $3x + 2x = 5x$, but $3x + 4y$ cannot be simplified.
- x and x^2 are **not** like terms.
- Deal with each letter separately, and treat the plain numbers as another group.
- Write algebra tidily: **a** not $1a$, **2a** not $a + a$, **ab** not $b \times a$, **a²** not $a \times a$.
- A negative coefficient is fine: $4a - 7a = -3a$.
- For fraction terms, use a common denominator: $3a/4 + 5a/12 = 9a/12 + 5a/12 = 14a/12 = 7a/6$.

A · Fluency — Simplify by collecting like terms.

1 Simplify: $3x + 2x$

2 Simplify: $5a - 2a$

3 Simplify: $7b + b$

4 Simplify: $9m - 4m$

5 Simplify: $4x + 3y + 2x - y$

6 Simplify: $6p + 2q - p + 5q$

7 Simplify: $2a + 3b + 4a$

8 Simplify: $8c - 3c + 2d$

9 Simplify: $5x + 7 - 2x - 3$

10 Simplify: $10 - 3n + 4n$

11 Simplify: $3s + 4t - 3s$

12 Simplify: $2u + 5v - 2v$

13 Simplify: $a + a + a + a$

14 Simplify: $6y - y - 2y$

15 Simplify: $4e + 3f - 2e - 3f$

16 Simplify: $12k - 5k + 2$

17 Simplify: $3a/4 + 5a/12$

18 Simplify: $a/2 + 5a/8$

19 Simplify: $y/2 - y/6$

20 Simplify: $2x/3 - 5x/12$

21 Simplify: $3a/4 + a/2$

22 Simplify: $3b/5 + 7b/15$

23 Simplify: $2c + c/3$

24 Simplify: $x/3 + x/4$

B · Reasoning — Which terms are like, and correct notation.

25 Which pair are **like terms**?

- ☐ $3x$ and $3y$
- ☐ $5a$ and $2a$
- ☐ $4p$ and 4
- ☐ $2m$ and m^2

26 Zara writes $3x + 4y = 7xy$. Is she correct?

- ☐ Yes
- ☐ No

27 Write $1 \times a$ in its simplest form.

28 Write $a \times b$ in its simplest form.

29 Write $b \times a$ in its simplest form.

30 Write $a \times a \times a$ in index form.

31 Simplify $a + a$ and then compare with $a \times a$. Give the answer to $a + a$.

- 32 An algebraic pyramid has bottom row $c + d$, then the two bricks above it. If the bottom-left brick is $c + d$ and the next is $6c + 2d$, what is the brick above them?
- 33 In an algebraic pyramid the top brick is $12c + 11d$ and one of the two bricks below it is $7c + 3d$. What is the other one?
- 34 Simplify $5x + 3 - 2x + 7$.
- 35 Simplify $4a - 7a$.
- 36 How many terms are there in the simplified form of $2x + 3y + 5x - y$?

C · Challenge — Brackets, powers and perimeters.

- 37 Simplify $3(a + 2) + 2a$. (Expand first, then collect like terms.)
- 38 Simplify $4x + 2y - 3x + 5y - 7$.
- 39 Simplify $2ab + 3ab - ab$.
- 40 Simplify $a^2 + 3a^2 - 2a^2$.
- 41 Simplify $5x + 2x^2$. (Careful — think about whether these are like terms.)
- 42 A rectangle has length $3x + 2$ and width $x - 1$. Write a simplified expression for its perimeter.
- 43 A triangle has sides $2a + 1$, $3a - 2$ and $a + 4$. Write a simplified expression for its perimeter.
- 44 Simplify $3a/4 + a/2$ and give your answer as a single fraction.

D · Word problems — Simplifying expressions from contexts.

- 45 A red brick is x cm long and a blue brick is y cm long. Write a simplified expression for the total length of three red bricks and two blue bricks, in cm.
- 46 A shop sells pens at $\$p$ and rulers at $\$r$. Ravi buys 4 pens and 3 rulers; Mia buys 2 pens and 5 rulers. Write a simplified expression for the total spent.

- 47** A square has side length s . A second square has side length $2s$. Write a simplified expression for the total perimeter of both squares.
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- 48** A bus has b passengers. At the first stop 5 get on, at the second 3 get off, at the third 7 get on. Write a simplified expression for the number on board.
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- 49** A rectangle is $2x$ cm long and 3 cm wide. Another is x cm long and 3 cm wide. Write a simplified expression for the total of their perimeters, in cm.
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- 50** Ali has n marbles. Ben has 3 times as many. Cara has 5 fewer than Ali. Write a simplified expression for the total number of marbles.
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- 51** A trip costs $\$c$ per student and $\$a$ per adult. 30 students and 4 adults go in the morning, and 20 students and 3 adults in the afternoon. Write a simplified expression for the total cost.
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- 52** A garden path is made of p paving slabs each x cm long, plus a 40 cm step. Two such paths are laid end to end. Write a simplified expression for the total length, in cm.
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- 53** A recipe uses f grams of flour and s grams of sugar. Write a simplified expression for the total mass, in grams, of a double batch and a single batch.
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- 54** A phone costs $\$x$ and a case costs $\$y$. A shop sells 6 phones with cases and then 2 extra cases. Write a simplified expression for the total takings.
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- 55** A rectangle has length $5a$ and width $2a$. Write a simplified expression for its perimeter.
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- 56** A number is n . Write a simplified expression for the total of the number, double the number and half the number.
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