GRADE 7 · UNIT 9 · LESSON 1

Adding and Subtracting Linear Expressions With Integer Coefficients

MA.7.AR.1.1

I can add and subtract linear expressions with integer coefficients by combining like terms.

Warm-Up

1. A parallelogram: base 9 cm, height 4 cm. Find the area.
2. Find the value: $-8 + 13$
3. A bag holds 3 red and 5 blue cubes. One is drawn. Find P(red).
4. What does $3x$ mean? Write it as a sum.

Warm-Up

1. A parallelogram: base 9 cm, height 4 cm. Find the area.

   $36\ \text{cm}^2$

2. Find the value: $-8 + 13$ **5**

3. A bag holds 3 red and 5 blue cubes. One is drawn. Find P(red).

   $\frac{3}{8}$

4. What does $3x$ mean? Write it as a sum. **$x + x + x$**

Vocabulary

linear expression

numbers, a variable, + or − signs, no equals sign: 5x − 3

term

one piece of an expression: 5x and −3 are the terms of 5x − 3

coefficient

the number multiplying the variable: 5 in 5x; 1 in x alone

Vocabulary

constant

a term with no variable: –3

like terms

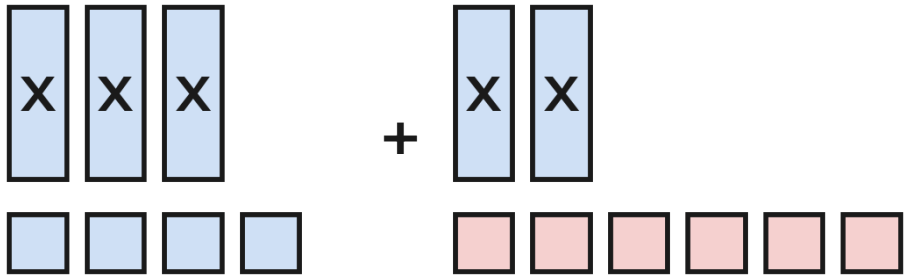
the same variable, or both constants: 5x and 2x

fewest terms

like terms combined: 5x + 2x – 3 is 7x – 3

Notes

I. Like terms: the tiles



$$(3x + 4) + (2x - 6) = 5x - 2$$

Five x-tiles. Four blue and six red squares: four zero pairs (a blue and a red add to 0), two red left.

Notes

II. Like terms: the symbols

$$(5x - 3) + (2x + 9) = 7x + 6$$

5x and 2x are like terms: 7x. –3 and 9 are like terms: 6. 7x and 6 are unlike, so 7x + 6 is finished.

The sign travels with its term: the –3 is a constant, not a subtraction waiting to happen.

Notes

III. Subtracting a group: write the –1

$$(6x + 1) - (2x - 5)$$

$$= (6x + 1) + (-1)(2x - 5)$$

$$= 6x + 1 - 2x + 5 = 4x + 6$$

Write the –1 in front of the group. It multiplies every term inside, so –5 becomes +5.

Then combine like terms.

Example 1

$$(4x + 5) + (3x - 8)$$

Write the sum with the fewest terms.

Example 1

$4x + 5 + 3x - 8$

$(4x + 3x) + (5 - 8)$

$7x - 3$

Answer: $7x - 3$

Your Turn

$$(4x - 3) + (3x + 7)$$

Write the sum with the fewest terms.

Your Turn

$$(4x - 3) + (3x + 7)$$

Write the sum with the fewest terms.

$4x + 3x = 7x$

$-3 + 7 = 4$

$7x + 4$

Answer: $7x + 4$

Example 2

$$(8x + 2) - (3x - 4)$$

Write the difference with the fewest terms.

Example 2

$$(8x + 2) + (-1)(3x - 4)$$

$$8x + 2 - 3x + 4$$

$$5x + 6$$

Answer: 5x + 6

Your Turn

$$(9x - 2) - (4x - 3)$$

Write the difference with the fewest terms.

Your Turn

$$(9x - 2) - (4x - 3)$$

Write the difference with the fewest terms.

$(9x - 2) - (4x - 3) = 9x - 2 - 4x + 3$

$9x - 4x = 5x, \quad -2 + 3 = 1$

$5x + 1$

Answer: $5x + 1$

Whiteboards · Question 1 of 9

$$(2x + 3) + (4x + 1)$$

Answer it.

Whiteboards · Question 1 of 9

$$(2x + 3) + (4x + 1)$$

$2x + 4x = 6x$

$3 + 1 = 4$

$6x + 4$

Answer: $6x + 4$

Whiteboards · Question 2 of 9

$$(2x + 3) + (4x - 1)$$

Answer it.

Whiteboards · Question 2 of 9

$$(2x + 3) + (4x - 1)$$

$2x + 4x = 6x$

$3 - 1 = 2$

$6x + 2$

Answer: $6x + 2$

Whiteboards · Question 3 of 9

$$(2x + 3) + (-4x - 1)$$

Answer it.

Whiteboards · Question 3 of 9

$$(2x + 3) + (-4x - 1)$$

$$2x - 4x = -2x$$

$$3 - 1 = 2$$

$$-2x + 2$$

Answer: $-2x + 2$

Whiteboards · Question 4 of 9

$$(5 - 2x) + (4x - 8)$$

Answer it.

Whiteboards · Question 4 of 9

$$(5 - 2x) + (4x - 8)$$

$$-2x + 4x = 2x$$

$$5 - 8 = -3$$

$$2x - 3$$

Answer: $2x - 3$

Whiteboards · Question 5 of 9

$$(6m + 5) + (m - 2)$$

A. $11m - 2$

B. $7m + 3$

C. $6m + 3$

D. $7m + 7$

Answer it.

Whiteboards · Question 5 of 9

$$(6m + 5) + (m - 2)$$

$6m + m = 7m$

$5 - 2 = 3$

$7m + 3$

Answer: B — 7m + 3

Whiteboards · Question 6 of 9

A box holds 7x + 2 marbles and weighs 4 pounds. Then 3x + 5 marbles are taken out.

How many marbles are left in the box?

Answer it.

Whiteboards · Question 6 of 9

A box holds $7x + 2$ marbles and weighs 4 pounds. Then $3x + 5$ marbles are taken out.

How many marbles are left in the box?

$$(7x + 2) - (3x + 5) = 7x + 2 - 3x - 5$$

$$7x - 3x = 4x, \quad 2 - 5 = -3$$

$4x - 3$ marbles

Answer: $4x - 3$

Whiteboards · Question 7 of 9

$$(7x + 2) - (3x - 5)$$

Answer it.

Whiteboards · Question 7 of 9

$$(7x + 2) - (3x - 5)$$

$(7x + 2) - (3x - 5) = 7x + 2 - 3x + 5$

$7x - 3x = 4x$, $2 + 5 = 7$

$4x + 7$

Answer: $4x + 7$

Whiteboards · Question 8 of 9

$$4 - (2y + 6)$$

A. $2y - 2$

B. $-2y + 2$

C. $-2y + 10$

D. $-2y - 2$

Answer it.

Whiteboards · Question 8 of 9

$$4 - (2y + 6)$$

$$4 - (2y + 6) = 4 - 2y - 6$$

$$4 - 6 = -2$$

$$-2y - 2$$

Answer: D — $-2y - 2$

Whiteboards · Question 9 of 9

Rae says the answer to $(4k + 3) + (-4k + 2)$ has to have a k in it.

Is she right? Explain.

Write your answer in sentences.

Whiteboards · Question 9 of 9

Rae says the answer to $(4k + 3) + (-4k + 2)$ has to have a k in it.

Is she right? Explain.

$4k - 4k = 0$ — the k-tiles are a zero pair

$3 + 2 = 5$

No. The answer is 5.

Answer: No — 4k and –4k are a zero pair, so the sum is 5.

Independent Practice

1. Rewrite with the fewest terms: $(3x + 5) + (2x + 1)$
2. Rewrite with the fewest terms: $(3x + 5) + (2x - 9)$
3. Rewrite with the fewest terms: $(8 - 5m) + (2m - 1)$
4. Rewrite with the fewest terms: $(9x + 4) - (5x + 1)$
5. Rewrite with the fewest terms: $(9x + 4) - (5x - 1)$
6. Rewrite with the fewest terms: $8 - (3y + 8)$

Before You Go

Like terms combine. Unlike terms stay apart.

Write the –1 in front of a subtracted group. It reaches every term.

Tomorrow: the same moves with fractions and decimals.

IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 60. Due by the Unit 9 test.

Today's skills — all required

Simplify expressions by combining like terms: with algebra tiles (PCU)
Simplify expressions by combining like terms (JJG)
Identify terms and coefficients (E7H)