

PART I GET STARTED**Today's Mathematics**

Identify signed terms and like terms; write and simplify expressions without changing their values.

Essential Question

How can we combine terms while keeping an expression equivalent?

DO NOW

Use the rational-number skills from Chapter 2. Show your work.

1. $\frac{3}{4} - \frac{5}{6}$

2. $-2.8 + 4.5$

3. $\left(-\frac{3}{5}\right)(10)$

4. $7 - (-9)$

SEE IT

Think of $6x + 9 - 2x + 4$ as a sum of these signed terms:

$6x$	$+9$	$-2x$	$+4$
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Circle terms that count the same kind of quantity. What can you combine? What must stay separate?

QUICK WRITE | 2 MINUTES

Explain why $3x + 2$ and $5x$ do not mean the same thing. Use words or a value of x to support your reasoning.

PART II INVESTIGATE

SAME VALUE, DIFFERENT FORM

Work with a partner. Complete the table. Then look for expressions that are equivalent for *every* value of x .

No.	Expression	$x = -2$	$x = 0$	$x = 3$
A	$4x + 6 - x + 2$			
B	$3x + 8$			
C	$5x + 8 - 2x$			
D	$3x + 2$			

THINK LIKE A MATHEMATICIAN

1. Which expressions are equivalent? Justify your choice by regrouping their signed terms. Matching table values alone are not enough.

2. Why must the term $-x$ stay negative when you place it next to $4x$?

CREATE

Write an expression with exactly four nonzero terms, including a negative term, that is equivalent to $5x + 1$. Show how your expression simplifies.

PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

Terms are the addends when an expression is written as a sum; keep each sign. A **coefficient** multiplies a variable part; a **constant term** has no variable.

Like terms have the same variable parts and exponents. Constants are also like terms. Combine coefficients, keeping the variable part.

Equivalent expressions have the same value for every allowed variable value. In **simplest form**, there are no like terms left to combine and no parentheses.

WORKED MODEL

$$\begin{aligned} -5y + 8 + 2y - 11 &= (-5 + 2)y + (8 - 11) \\ &= -3y - 3 \end{aligned}$$

Reorder and group signed terms; add the coefficients and the constants separately.

TRY IT

1. $-7a + 4 + 3a - 9$

2. $\frac{2}{3}t + 5 - \frac{1}{6}t$

3. Each volunteer receives a badge costing \$2.40, a pen costing \$1.35, and a folder costing \$0.75. Write and simplify a cost expression for n volunteers. Interpret its coefficient. Find the cost for 8 volunteers.

MATH WRITE | 5 MINUTES

Noah writes $7r + 5 - 3r = 9r$. Identify his error and give the correct expression. Explain why the constant term cannot be combined with the r -terms.

PART IV PUZZLE PRACTICE

Homework

Name _____

Date _____

Simplify each expression. Find it in the answer bank and place its letter in the matching numbered box. The message names what you can combine.

1. $8x - 3x$

2. $-6x + 2x$

3. $8 + 4x - 2$

4. $3x + 9 + x - 4$

5. $2.5x + 1.2x - x$

6. $\frac{3}{4}x + 2 - \frac{1}{4}x$

7. $4a + 3b - 6a + b$

8. $-x + 7 + 4x - 10$

9. Each workshop participant receives a \$0.60 sticker and a \$0.90 pencil. Write the total cost for n participants in simplest form.

ANSWER BANK

R $-2a + 4b$	E $4x + 5$	L $5x$
M $3x - 3$	S $1.5n$	I $-4x$
E $\frac{1}{2}x + 2$	K $4x + 6$	T $2.7x$

1

2

3

4

5

6

7

8

9