

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

Add and subtract linear expressions by grouping like terms and adding opposites.

Essential Question

Why does subtracting an expression change the sign of every term?

DO NOW

Review the previous section. Show organized work.

1. $6x + 5 - 2x - 8$

2. $-3a + a + 7$

3. $0.6t + 1.4t - t$

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

SEE IT

Each pair of signed tiles represents zero. A negative tile is the opposite of its matching positive tile.

$$+x$$

$$-x$$

$$+1$$

$$-1$$

How could you represent the opposite of $2x - 3$ with signed tiles?

QUICK WRITE | 2 MINUTES

What is the opposite of $-3x + 5$? Explain why both terms must change sign.

PART II INVESTIGATE

COMBINE OR ADD THE OPPOSITE

Let $A = 3x + 4$ and $B = x - 2$. Complete the table. For subtraction, rewrite the second expression as its opposite before combining.

No.	Operation	Rewrite without parentheses	Simplest form
1	$A + B$		
2	$A - B$		
3	$B - A$		

THINK LIKE A MATHEMATICIAN

1. Compare $A - B$ with $B - A$. What relationship do you notice? Explain why it works for every value of x .

2. Why is $(3x + 4) - (x - 2)$ not the same as $3x + 4 - x - 2$?

CREATE

Write a linear expression that can be added to $4x - 3$ to give $7x + 2$. Verify by showing the complete sum.

PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

A **linear expression** combines constants and variable terms of degree 1. Variables are not multiplied together or placed in denominators.

To **add**, group like terms. To **subtract**, add the opposite of *every* term in the second expression, then combine. Align like terms vertically or group them horizontally. Terms may cancel completely.

WORKED MODEL

$$\begin{aligned}(2.5t - 4) - (1.5t + 6) &= 2.5t - 4 - 1.5t - 6 \\ &= (2.5 - 1.5)t + (-4 - 6) \\ &= t - 10\end{aligned}$$

Both $1.5t$ and 6 change sign when their expression is subtracted.

TRY IT

1. $(4n - 3) + (2n + 8)$

2. $(\frac{5}{6}n + 2) - (\frac{1}{3}n - 4)$

3. A club receives $(9h + 12)$ dollars and spends $(5h + 7)$ dollars on supplies. Write and simplify its profit. What does the constant term mean?

MATH WRITE | 5 MINUTES

A student writes $(7x - 2) - (3x - 6) = 4x - 8$. Correct the work and explain the sign change that was missed.

PART IV PUZZLE PRACTICE

Homework

Name _____

Date _____

Simplify or factor as directed. Match each result to the answer bank. Write its letter in the matching numbered box to reveal a mathematical reminder.

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

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

3. $(-3x + 5) + (x - 9)$

4. $(4x + 1) - (-2x + 5)$

5. $(0.8x + 3) + (1.2x - 7)$

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

7. $(x - 6) - (x + 2)$

8. The opposite of $3x - 5$

9. Team A collects $(6c + 8)$ cans; Team B collects $(2c - 1)$ cans. Write the difference, Team A minus Team B.

ANSWER BANK

I $\frac{1}{2}x - 3$	O $3x + 7$	S $4c + 9$
P $-2x - 4$	E $-3x + 5$	O $6x - 4$
T -8	S $2x - 4$	P $4x - 8$

1	2	3	4	5	6	7	8	9