

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

Use the distributive property to write equivalent expressions with rational coefficients.

Essential Question

How can one product describe the same quantity as a sum?

DO NOW

Review the previous section. Show organized work.

1. $(5x + 2) + (3x - 7)$

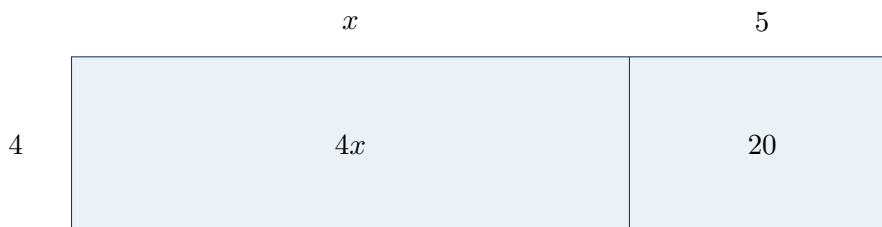
2. $(6a - 4) - (2a + 3)$

3. $-3(8)$

4. $\frac{2}{3}(9)$

SEE IT

A rectangle has height 4 units and width $(x + 5)$ units, where $x > 0$. Explain how the two smaller areas make the whole area.

**QUICK WRITE | 2 MINUTES**

Why must the 4 multiply both x and 5 in $4(x + 5)$? Use the rectangle in your explanation.

PART II INVESTIGATE

ONE PRODUCT, SEVERAL PARTS

Complete each expansion. In the last column, evaluate both forms at $x = 3$ to check that they agree.

No.	Product	Expanded expression	Both values at $x = 3$
1	$3(x + 4)$		
2	$3(x - 4)$		
3	$-2(x + 4)$		
4	$\frac{1}{2}(6x - 8)$		

THINK LIKE A MATHEMATICIAN

1. How does distributing a negative factor affect the signs of the terms inside parentheses? Explain using row 3.

2. Would the property also work for $3(x + 4 + 2x)$? Write an equivalent expression with no parentheses.

COMPARE

Compare two routes for $5(2x + 3x - 1)$: combine like terms first, or distribute first. Show both. Which route do you prefer?

PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

Distributive property: $a(b + c) = ab + ac$ and $a(b - c) = ab - ac$. Multiply the outside factor by *every* term inside. The property works with negative, fractional, and decimal factors.

After distributing, combine like terms. You may combine like terms inside parentheses first when that makes the work easier.

WORKED MODEL

$$-\frac{3}{4}(8x - 12) + 2x = -6x + 9 + 2x = -4x + 9$$

Both products matter: $(-\frac{3}{4})(8x) = -6x$ and $(-\frac{3}{4})(-12) = 9$.

TRY IT

1. $-4(2n + 3) + 5n$

2. $\frac{2}{5}(15t - 10) - t$

3. A rectangular sign is 3 feet tall and $(2w + 1)$ feet wide. Write its area as a product and as a simplified expression. Include units.

MATH WRITE | 5 MINUTES

A student claims $2(3x + 4) - x = 5x + 4$. Identify the error, give the correct expression, and explain why a check at $x = 0$ exposes the error.

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. $4(x + 2)$

2. $-3(x - 5)$

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

4. $\frac{1}{2}(10x + 6)$

5. $-2(4x + 1) + 3x$

6. $0.4(5x - 10)$

7. $3(2x + 1) - 2(x - 4)$

8. $-\frac{2}{3}(9x - 6)$

9. $5(x + 2x - 1)$

ANSWER BANK

T $2x - 4$	E $4x + 11$	V $-3x + 15$
M $15x - 5$	E $4x + 8$	Y $-5x - 2$
R $5x + 3$	R $-6x + 4$	E $7x - 8$

1

2

3

4

5

6

7

8

9