Lesson 7-4

Subtracting Linear Expressions

Interactive Study Guide

See pages 157–158 for:
- Getting Started
- Real-World Link
- Notes

Essential Question

Why are algebraic rules useful?

Common Core State Standards

Content Standards
7.EE.1

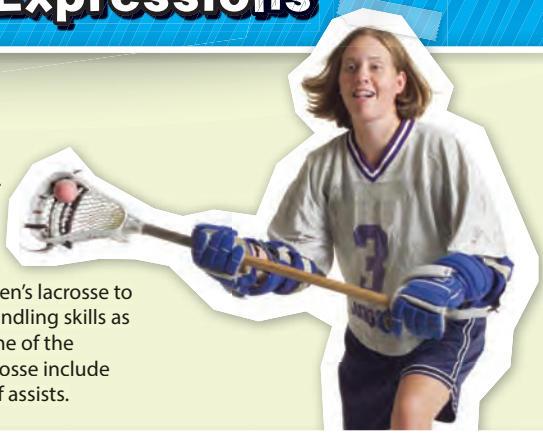
Mathematical Practices
1, 3, 4, 7

What You'll Learn

- Subtract linear expressions.
- Solve real-world problems by subtracting linear expressions.

Real-World Link

Lacrosse Middle school girls play a modified version of women's lacrosse to help them acquire good ball-handling skills as they are learning the sport. Some of the statistics that are tracked in lacrosse include number of goals and number of assists.



Subtract Linear Expressions

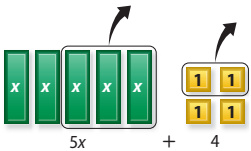
When subtracting linear expressions, subtract like terms. As with adding linear expressions, you can use models and zero pairs if needed.

Example 1

Tools Tutor

Subtract. Use models if needed.

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



Model the linear expression $5x + 4$.

To subtract $3x + 2$, remove three x-tiles and two 1-tiles.

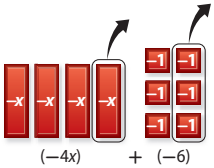
Then write the linear expression for the remaining tiles.

So, $(5x + 4) - (3x + 2) = 2x + 2$.

b. $-4x - 6 - (-x - 3)$

Arrange like terms in columns.
Each term is subtracted.

$$\begin{array}{r} -4x - 6 \\ -\quad -x - 3 \\ \hline \end{array} \quad \rightarrow \quad \begin{array}{r} -4x - 6 \\ +\quad x + 3 \\ \hline -3x - 3 \end{array}$$



So, $(-4x - 6) - (-x - 3) = -3x - 3$.

Got It? Do these problems to find out.

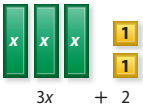
1a. $(7x - 5) - (2x - 1)$ $5x - 4$

1b. $(6x - 4) - (2x - 4)$ $4x$

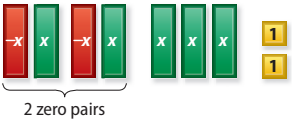
Example 2

Watch Tools Tutor

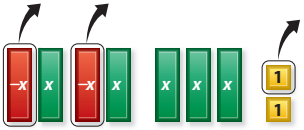
Find $(3x + 2) - (-2x + 1)$.



Model the linear expression $3x + 2$.



Since there are no negative x-tiles to remove, add 2 zero pairs of x-tiles.



Remove 2 negative x-tiles and one 1-tile.

So, $(3x + 2) - (-2x + 1) = 5x + 1$.

Got It? **Do these problems to find out.**

2a. Find $(x - 5) - (2x - 1)$. $-x - 4$

2b. Find $(6m + 3) - (-4m - 1)$. $10m + 4$

Solve Problems with Linear Expressions

You can solve real-world problems by subtracting linear expressions.

Real World

Example 3

Tutor

Watch Out!

When subtracting $(2x + 24)$, subtract both $2x$ and 24, which is written as $-2x - 24$.

The expression $8x + 48.75$ represents the total amount of money the soccer team earned from selling x T-shirts.

a. If the team had to pay $(2x + 24)$ dollars in expenses, write an expression to represent their profit.

$$\begin{aligned} \text{Total} - \text{Expenses} &= (8x + 48.75) - (2x + 24) && \text{Subtract.} \\ &= 8x + 48.75 - 2x - 24 && \text{Distributive Property} \\ &= 6x + 24.75 && \text{Simplify.} \end{aligned}$$

b. If the soccer team sold 54 T-shirts, what was their profit?

$$\begin{aligned} 6x + 24.75 &= 6(54) + 24.75 && \text{Replace } x \text{ with 54.} \\ &= 324 + 24.75 \text{ or } 348.75 && \text{Simplify.} \end{aligned}$$

So, the soccer team made \$348.75 profit.

Got It? **Do this problem to find out.**

3. After working x hours on Monday, Kay earns $9x$ dollars. On Tuesday, she earns $(7x + 3)$ dollars.

a. Write an expression to represent how much more she earned on Monday. $2x - 3$

b. If she worked for 5 hours each day, how much more did she earn on Monday? \$7