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Lesson 1 Reteach

The Distributive Property

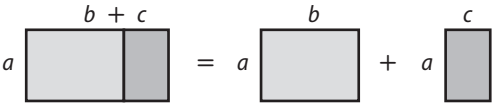
The expressions $2(1 + 5)$ and $2 \cdot 1 + 2 \cdot 5$ are equivalent expressions because they have the same value, 12. The **Distributive Property** combines addition and multiplication. The Distributive Property can also be used with algebraic expressions containing variables.

Symbols

$a(b + c) = ab + ac$

$(b + c)a = ab + ac$

Model



The Distributive Property also combines subtraction and multiplication.

Symbols

$a(b - c) = ab - ac$

$(b - c)a = ab - ac$

Example 1 **Use the Distributive Property to write $2(6 + 3)$ as an equivalent expression. Then evaluate the expression.**

$2(6 + 3) = 2 \cdot 6 + 2 \cdot 3$ Distributive Property

$= 12 + 6$ Multiply.

$= 18$ Add.

Example 2 **Use the Distributive Property to write $3(n - 8)$ as an equivalent algebraic expression.**

$3(n - 8) = 3[n + (-8)]$ Rewrite $n - 8$ as $n + (-8)$.

$= 3n + 3 \cdot (-8)$ Distributive Property

$= 3n + (-24)$ Simplify.

$= 3n - 24$ Definition of subtraction

Exercises

Use the Distributive Property to write each expression as an equivalent expression. Then evaluate the expression.

1. $3(8 + 2)$ **2.** $2(9 + 11)$ **3.** $5(19 - 6)$

4. $-6(3 + 14)$ **5.** $(17 - 4)3.5$ **6.** $(6 + 4)\frac{1}{2}$

Use the Distributive Property to write each expression as an equivalent algebraic expression.

7. $-14(j + 3)$ **8.** $(a - 15)20$ **9.** $9(h + 50)$

10. $-12(s - 2)$ **11.** $0.2(x + 60)$ **12.** $\frac{1}{4}(c - 12)$

Lesson 1 Reteach

The Distributive Property

Exercises

Use the Distributive Property to write each expression as an equivalent expression. Then evaluate the expression.

1. $3(8 + 2)$
$3 \cdot 8 + 3 \cdot 2$; 30

2. $2(9 + 11)$
$2 \cdot 9 + 2 \cdot 11$; 40

3. $5(19 - 6)$
$5 \cdot 19 + 5 \cdot (-6)$; 65

4. $-6(3 + 14)$
$-6 \cdot 3 + (-6)(14)$; -102

5. $(17 - 4)3.5$
$17 \cdot 3.5 + (-4) \cdot 3.5$; 45.5

6. $(6 + 4)\frac{1}{2}$
$6 \cdot \frac{1}{2} + 4 \cdot \frac{1}{2}$; 5

Use the Distributive Property to write each expression as an equivalent algebraic expression.

7. $-14(j + 3)$
$-14j - 42$

8. $(a - 15)20$
$20a - 300$

9. $9(h + 50)$
$9h + 450$

10. $-12(s - 2)$
$-12s + 24$

11. $0.2(x + 60)$
$0.2x + 12$

12. $\frac{1}{4}(c - 12)$
$\frac{1}{4}c - 3$

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Lesson 2 Reteach

Simplifying Algebraic Expressions

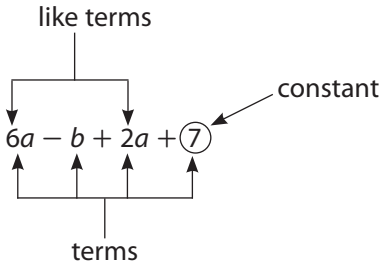
Listed below are some definitions related to algebraic expressions.

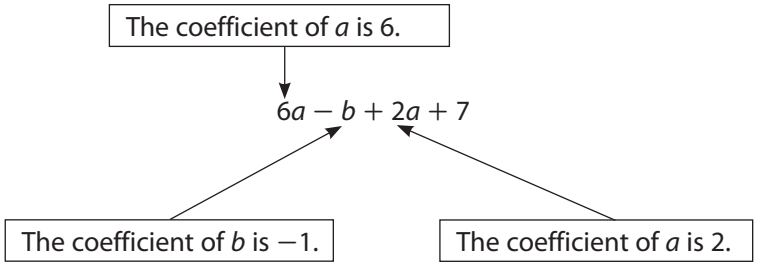
term: a number, variable, or a product of numbers and variables; terms in an expression are seperated by addition or subtraction signs

coefficient: the numerical part of a term that also contains a variable

constant: term without a variable

like terms: terms that contain the same variables





When an algebraic expression has no like terms and no parentheses, it is in **simplest form.**

To make it easier to simplify an algebraic expression, rewrite subtraction as addition. Then use the Commutative Property to group like terms together.

Example

Simplify $5t - 7(s - 4t)$.

$5t - 7(s - 4t)$	$= 5t + (-7)[s + (-4t)]$	Definition of Subtraction
	$= 5t + (-7s) + (-7 \cdot -4t)$	Distributive Property
	$= 5t + (-7s) + 28t$	Simplify.
	$= 5t + 28t + (-7s)$	Commutative Property
	$= 33t + (-7s)$ or $33t - 7s$	Simplify.

Exercises

Simplify each expression.

1. $9m + 3m$

2. $5x - x$

3. $8y + 2y + 3y$

4. $4.3x - 8.1 + 0.2x - 17.5$

5. $-7.6 - 9y - 6.5 + 4.7y$

6. $-0.3g - 4.2 + 6.1g - 0.9$

7. $\frac{1}{5}(p - 10) + 13p - 7$

8. $(a + 12)\frac{5}{6} - 5a + 11$

9. $-6h - 5 + \frac{2}{3}(24h - 12)$

Lesson 2 Reteach

Simplifying Algebraic Expressions

Exercises

Simplify each expression.

1. $9m + 3m$

12*m*

2. $5x - x$

4*x*

3. $8y + 2y + 3y$

13*y*

4. $4.3x - 8.1 + 0.2x - 17.5$

4.5*x* − 25.6

5. $-7.6 - 9y - 6.5 + 4.7y$

−4.3*y* − 14.1

6. $-0.3g - 4.2 + 6.1g - 0.9$

5.8*g* − 5.1

7. $\frac{1}{5}(p - 10) + 13p - 7$

$13\frac{1}{5}p - 9$

8. $(a + 12)\frac{5}{6} - 5a + 11$

$-4\frac{1}{6}a + 21$

9. $-6h - 5 + \frac{2}{3}(24h - 12)$

10*h* − 13

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Lesson 3 Reteach

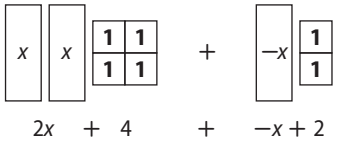
Adding Linear Expressions

A **linear expression** is an algebraic expression in which the variable is raised to the first power. You can use models to add linear expressions.

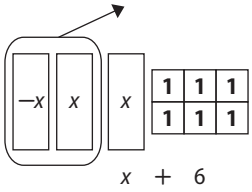
Example

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

Step 1 Model the linear expressions.



Step 2 Group tiles with the same shape. Then remove any zero pairs.



So, $(2x + 4) + (-x + 2) = x + 6$.

Exercises

Add. Use models if needed.

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

2. $(-x + 6) + (-5x + 8)$

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

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

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

6. $(-3x - 1) + (-6x + 2)$

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

8. $(12x - 5) + (-3x + 8)$

Lesson 3 Reteach

Adding Linear Expressions

Exercises

Add. Use models if needed.

1. $(2x + 6) + (5x + 1)$
$7x + 7$

2. $(-x + 6) + (-5x + 8)$
$-6x + 14$

3. $(x - 7) + (3x - 3)$
$4x - 10$

4. $(-x + 7) + (-2x + 6)$
$-3x + 13$

5. $(x + 3) + (-5x + 4)$
$-4x + 7$

6. $(-3x - 1) + (-6x + 2)$
$-9x + 1$

7. $(2x + 3) + (-2x + 7)$
10

8. $(12x - 5) + (-3x + 8)$
$9x + 3$

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Lesson 4 Reteach

Subtracting Linear Expressions

You can subtract linear expressions using models. Draw a model to represent the first linear expression. Then, remove the tiles that are represented by the second linear expression.

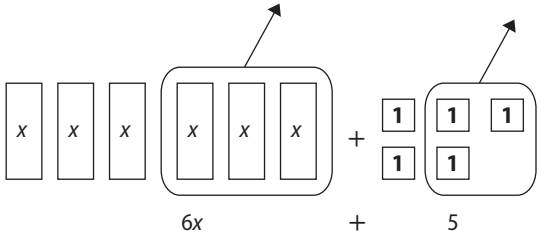
Example

Subtract. Use models.

a. $(6x + 5) - (3x + 3)$

Step 1 Model the linear expression $6x + 5$.

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

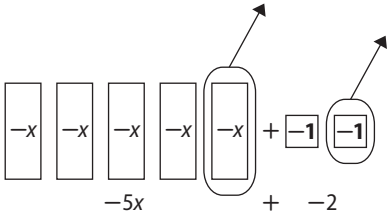


Step 3 Write the linear expression for the remaining tiles.
$(6x + 5) - (3x + 3) = 3x + 2$

b. $(-5x - 2) - (-x - 1)$

Step 1 Write the linear expression as the sum of terms. Then model the linear expression.

Step 2 To subtract $-x - 1$, remove one negative x-tiles and one negative 1-tile.



Step 3 Write the linear expression for the remaining tiles.
$(-5x - 2) - (-x - 1) = -4x - 1$

Exercises

Subtract. Use models if needed.

1. $(6x - 3) - (2x - 2)$

2. $(5x + 6) - (2x + 3)$

3. $(6x + 3) - (2x - 1)$

4. $(-3x - 7) - (-2x - 6)$

5. $(7x - 4) - (5x + 2)$

6. $(-x + 3) - (4x - 1)$

Lesson 4 Reteach

Subtracting Linear Expressions

Exercises

Subtract. Use models if needed.

1. $(6x - 3) - (2x - 2)$ **$4x - 1$**

2. $(5x + 6) - (2x + 3)$ **$3x + 3$**

3. $(6x + 3) - (2x - 1)$ **$4x + 4$**

4. $(-3x - 7) - (-2x - 6)$ **$-x - 1$**

5. $(7x - 4) - (5x + 2)$ **$2x - 6$**

6. $(-x + 3) - (4x - 1)$ **$-5x + 4$**

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Lesson 5 Reteach

Factoring Linear Expressions

A **linear expression** is in factored form when it is expressed as the product of its factors.

Example 1 Factor $5x + 10$.

Use the GCF to factor the linear expression.

$5x = 5 \cdot x$ Write the prime factorization of $5x$ and 10.
$10 = 5 \cdot 2$ Circle the common factors.

The GCF of $5x$ and 10 is 5. Write each term as a product of the GCF and its remaining factors.

$5x + 10 = 5(x) + 5(2)$
$= 5(x + 2)$ Distributive Property

So, $5x + 10 = 5(x + 2)$.

Example 2 Factor $3x + 8$.

$3x = 3 \cdot x$ Write the prime factorization of $3x$ and 8.
$8 = 2 \cdot 2 \cdot 2$

There are no common factors, so $3x + 8$ *cannot be factored.*

Exercises

Factor each expression. If the expression cannot be factored, write *cannot be factored.* Use algebra tiles if needed.

1. $15x + 10$

2. $7x - 3$

3. $6x + 9$

4. $30x - 25$

5. $13x + 14$

6. $50x - 75$

7. $24x - 18$

8. $18x + 13$

9. $16x - 12$

10. $36x + 45$

Lesson 5 Reteach

Factoring Linear Expressions

1. $15x + 10$ **$5(3x + 2)$**

2. $7x - 3$ **cannot be factored**

3. $6x + 9$ **$3(2x + 3)$**

4. $30x - 25$ **$5(6x - 5)$**

5. $13x + 14$ **cannot be factored**

6. $50x - 75$ **$25(2x - 3)$**

7. $24x - 18$ **$6(4x - 3)$**

8. $18x + 13$ **cannot be factored**

9. $16x - 12$ **$4(4x - 3)$**

10. $36x + 45$ **$9(4x + 5)$**