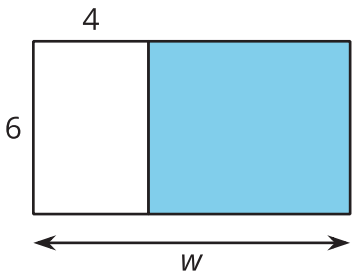
Unit 4, Lesson 10

The Distributive Property, Part 3

Let's practice writing equivalent expressions by using the distributive property.

10.1 The Shaded Region

A rectangle with side lengths 6 cm and w cm is partitioned into two smaller rectangles, as shown in the diagram.



Explain why each of these expressions represents the area, in cm^2, of the shaded region.

- $6w - 24$
- $6(w - 4)$

10.2 Matching to Practice Distributive Property

Match each expression in Column A to an equivalent expression in Column B.
If you get stuck, consider drawing a diagram. Be prepared to explain your reasoning.

Column A

1. $a(1+2+3)$
2. $2(12-4)$
3. $12a+3b$
4. $\frac{2}{3}(15a-18)$
5. $6a+10b$
6. $0.4(5-2.5a)$
7. $2a+3a$

Column B

- $3(4a+b)$
- $12 \cdot 2 - 4 \cdot 2$
- $2(3a+5b)$
- $(2+3)a$
- $a+2a+3a$
- $10a-12$
- $2-a$

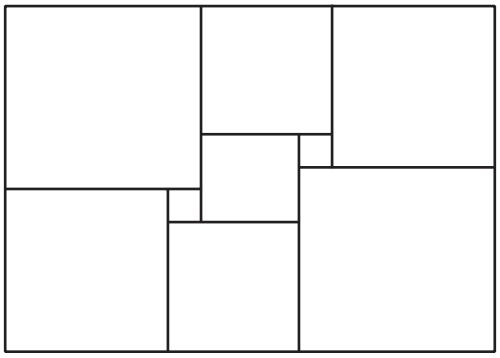
10.3 Writing Equivalent Expressions Using the Distributive Property

The distributive property can be used to write equivalent expressions.
In each row, use the distributive property to write an equivalent expression.
If you get stuck, consider drawing a diagram.

product	sum or difference
$3(3 + x)$	
	$4x - 20$
$(9 - 5)x$	
	$4x + 7x$
$3(2x + 1)$	
	$10x - 5$
	$x + 2x + 3x$
$\frac{1}{2}(x - 6)$	
$y(3x + 4z)$	
	$2xyz - 3yz + 4xz$

Are you ready for more?

This rectangle has been cut up into squares of varying sizes. Both of the smallest squares have a side length of 1 unit. The square in the middle has a side length of x units.



1. Suppose that x is 3. Find the area, in square units, of each square in the diagram. Then find the area of the large rectangle.

2. Find the side lengths of the large rectangle assuming that x is 3. Then find the area of the large rectangle by multiplying its length by its width. Check that this is the same area you found before.

3. Now suppose that we do not know the value of x. Write an expression for the side lengths of the large rectangle that involves x.

Lesson 10 Summary

The distributive property can be used to write a sum or difference as a product, or write a product as a sum or difference.

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

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

Here are some examples of expressions that are equivalent due to the distributive property.

$$9 + 18 = 9(1+2)$$

$$2(3x+4) = 6x + 8$$

$$(\ 2n + 3n + n = n(2+3+1)\ )$$

$$11b - 99a = 11(b - 9a)$$

$$k(c+d-e) = kc + kd - ke$$