



Evaluate the expressions. What is the value of each? [108 square units]

Since the expressions name the same number of square units, you can write an equation.

$$6 \times (10 + 8) = (6 \times 10) + (6 \times 8)$$

The **Distributive Property** states: Multiplying a sum (or difference) by a number is the same as multiplying each number in the sum (or difference) by that number and adding (or subtracting) the products.

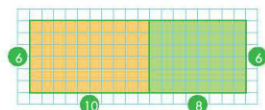
If the first expression is $6 \times (10 - 8)$, what second expression can you write using the Distributive Property? $[(6 \times 10) - (6 \times 8)]$

Prevent Misconceptions

Some students might think that because the addition symbol is inside the parentheses in the first expression, it goes inside the parentheses in the second expression as well. Point out that the 6 is multiplied by the sum of 10 and 8 in the first expression. The 6 must be multiplied by 10 and then by 8, and the products are added together in the second expression.

Three ways to find the number of square units:

- 1) Think of 6 rows with 18 in each row. 6×18
- 2) Think of 18 as $10 + 8$. $6 \times (10 + 8)$
- 3) Think of the figure in two parts.
The orange part has 6×10 square units.
The green part has 6×8 square units.



The total is the sum of the two parts.
 $(6 \times 10) + (6 \times 8)$

Since the expressions name the same number of square units, you can write an equation.

$$6 \times (10 + 8) = (6 \times 10) + (6 \times 8)$$

The **distributive property** states: Multiplying a sum (or difference) by a number is the same as multiplying each number in the sum (or difference) by that number and adding (or subtracting) the products.

For 9 through 16, rewrite each expression using the distributive property. Then find each product.

9–16 See margin.

9. 7×86 10. 7×420 11. 220×8 12. 45×60
13. 80×64 14. 16×102 15. 101×23 16. 390×40

Problem Solving

For 17 through 19, use the table at the right and the following information.

Wendy brought the lemonade and iced tea for the school picnic. Since more people like lemonade than iced tea, she brought 2 gallons of lemonade for every 10 people. She also brought 5 gallons of iced tea for people who don't like lemonade.

Number of People	Gallons of Lemonade	Total Gallons
10	2	7
20	4	9
30	6	11
40	8	13

17. Write an algebraic expression to show the total number of gallons Wendy would need to bring. Let n represent the number of groups of ten people.
 $2n + 5$

20. Use the distributive property to find another expression for $3(2x + 7)$.

- A $6x + 7$ C $(9x) \times 3$
B $3(14x)$ D $6x + 21$

18. How many gallons does Wendy need for 10 people?

$$(2 \times 1) + 5 = 7$$

19. Complete the rest of the table.
See table.

21. **Estimation** The highest point in Colorado is Mount Elbert, at 14,433 feet. About how many miles is that? **About 3 miles**

Tip 1 mile = 5,280 feet

3 Independent Practice

Students may have trouble deciding whether to use a sum or a difference when rewriting Exercise 16. Remind students that when a number being multiplied is near the next higher multiple of 10, 100, or 1,000 (such as 390×40), they should break it apart into 400 and 10 ($390 \times 40 = (400 - 10) \times 40 = 16,000 - 400 = 15,600$). *After you break 390 into 400 - 10, it is easier to multiply each factor by 40 because they both end in zero. You will then subtract to get the result.*

Problem Solving

Exercise	Content
17	Algebraic Expressions ($2n + 5$)
18	The Distributive Property (2×1) + 5
19	Evaluate Expressions ($2n + 5$)
20	The Distributive Property
21	Estimate ($15,000 \div 5,000$)

Students use underlying processes and mathematical tools for Exercises 17–21. Remind students to check for reasonableness when solving each problem.

Exercise 17

Language of Math: Everyday Vocabulary Students may have trouble translating the words of the problem into expressions. *How can you translate words into expressions?* [Write down the numbers and look for words that signal an operation.]

9. $(7 \times 80) + (7 \times 6) = 560 + 42 = 602$
10. $(7 \times 400) + (7 \times 20) = 2,800 + 140 = 2,940$
11. $(200 \times 8) + (20 \times 8) = 1,600 + 160 = 1,760$
12. $(40 \times 60) + (5 \times 60) = 2,400 + 300 = 2,700$
13. $(80 \times 60) + (80 \times 4) = 4,800 + 320 = 5,120$
14. $(16 \times 100) + (16 \times 2) = 1,600 + 32 = 1,632$
15. $(100 \times 23) + (1 \times 23) = 2,300 + 23 = 2,323$
16. $(400 \times 40) - (10 \times 40) = 16,000 - 400 = 15,600$