Visual Learning Animation
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What do the parentheses mean? [You have to multiply the numbers in the parentheses first.] *Explain the Associative Property of Multiplication for three factors in your own words.* [The grouping of the numbers can change but the product is the same.]

Identity Property of Multiplication
When you multiply any number by 1, the product is that number.

$5 \times 1 = 5$

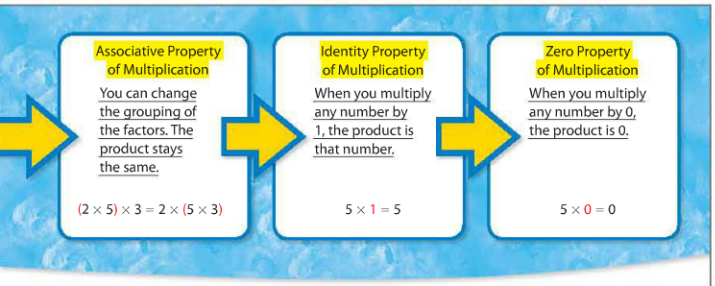
What is 6×1? [6] *What is 187×1?* [187] *What is any number times 1?* [That number]

Zero Property of Multiplication
When you multiply any number by 0, the product is 0.

$5 \times 0 = 0$

What is 8×0? [0] *What is 207×0?* [0] *What is any number times 0?* [0]

Prevent Misconceptions
Students may confuse the Identity and Zero Properties of Multiplication with those of addition. Have them model the properties with counters.



Reasoning In **20** through **25**, use the multiplication properties to determine the number that belongs in each box.

20. $1{,}037 \times \square = 1{,}037$
1

21. $5 \times (20 \times 9) = (5 \times 20) \times \square$
9

22. $(635 \times 47) \times \square = 0$
0

23. $8 \times (\square \times 4) = (8 \times 5) \times 4$
5

24. $75 \times \square = 42 \times 75$
42

25. $(9 \times 6) \times 4 = 9 \times (\square \times 4)$
6

Problem Solving

26. Writing to Explain Haley said that she would always know her 0 and 1 multiplication facts. Explain why Haley would say this.
See margin.

27. Writing to Explain How can one of the multiplication properties help you evaluate $(77 \times 25) \times 4$?
See margin.

28. Last month 48,097 people visited the zoo. The number 48,097 is how many more than 25,000?

A 2,079 **C** 23,097
B 12,097 **D** 320,079

29. Think About the Process Naomi ordered 2 bottles of water for $1.00 each and 1 turkey sandwich for $3.00. Which expression would you use to find how much Naomi paid?

A $(2 \times \$1) \times \$3$
B $2 \times (1 \times \$3)$
C $(2 + \$1) + \$2$
D $(2 \times \$1) + (1 \times \$3)$

30. Compare. Write >, <, or = for each ◯.

a 34,304 < 43,403
b 5.70 = 5.7
c 21,978 > 21,789

31. Three hundred fifty 10-year-olds registered for a city-wide bowling tournament. If 205 participants are boys, how many are girls?
145 girls

32. Critical Thinking Think of two numbers that will round to 14,000.
Sample answer: 13,894; 14,201

26. All numbers multiplied by zero equal zero, and all numbers multiplied by 1 equal that number.

27. You can use the Associative Property to regroup as $77 \times (25 \times 4)$. Then use mental math: $77 \times 100 = 7{,}700$.

3 Independent Practice

Students may have difficulty recognizing the properties when they are applied in an alternative format. In Exercise 22, because parentheses are used, students may assume it is an example of the Associative Property. *Did the grouping or the order change?* [No] *Is there a 0 or a 1 on either side of the equal sign?* [Yes] *Since the answer is 0, what number do you need to complete the multiplication?* [0]

Problem Solving

Exercise	Content
26	Identity and Zero Properties Communicate Math Understanding
27	Associative Property Communicate Math Understanding
28	Subtraction (48,097 − 25,000)
29	Write Expressions
30	Compare Whole Numbers and Decimals
31	Subtraction (350 − 205)
32	Rounding

Students use underlying processes and mathematical tools for Exercises 26–32. Remind students to check for reasonableness when solving each problem.

Exercise 29
Test-Taking Tip: Make Smart Choices Remember that sometimes you can work backward to eliminate wrong answers. *Look at the answer choices. Which choice would give the correct answer of $5?* [D]

Early Finishers *Draw a picture to illustrate this multiplication problem: $(2 \times 6) \times 3$. Then draw another picture to show the multiplication problem $2 \times (6 \times 3)$. Are the two drawings equivalent? Explain your answer.* [Yes, they both have a total of 36 dots.]