

Properties of Operations

Lesson 6-4

Name: _____

Date: _____

Class: _____

Key Vocabulary

Level 1 support

Picture first, then the word, then a plain-language meaning. Say each word out loud.

$3 + 7 = 7 + 3 = 10$ both ways; $4 \times 5 = 5 \times 4 = 20$
both ways — order does not matter

Commutative Property

You can change the order and get the same answer.

$(2 + 3) + 4 = 5 + 4 = 9$ and $2 + (3 + 4) = 2 + 7 = 9$ —
same answer, different grouping

Associative Property

You can change the grouping and get the same answer.

$9 + 0 = 9$ (zero is the identity for addition); $6 \times 1 = 6$
(one is the identity for multiplication)

Identity Property

Adding 0 or multiplying by 1 keeps the same value.

Commutative works for + and \times , but NOT for – or \div
(since $5 - 3 = 2$ but $3 - 5 = -2$)

Property

A rule that is always true in math.

In $3x$, the 3 is the coefficient — it tells you to
multiply x by 3

Coefficient

The number in front of a letter, like the 3 in $3x$.

$4x + 2x = 6x$ (like terms, both have x); $4x + 2y$ stays
as $4x + 2y$ (unlike terms)

Like terms

Terms with the same letter, like $2x$ and $5x$.

Key Ideas & Notes

- You're a band director arranging musicians on stage.
- You have 3 guitarists, 5 drummers, and 2 keyboard players.
- Whether you seat the guitarists first or the drummers first, you still have $3 + 5 + 2 = 10$ musicians.
- The order you arrange them doesn't change the total!
- Read each pair of expressions. Identify which property of operations is being shown.

Think About It

- Does the order you add the musicians change the total?
- What if you group different sections together first — does the total change?
- What happens when you add 0 musicians to a group?

My Notes

Guided Examples

Example 1

Which property is shown? $5 + 13 = 13 + 5$

Solution: The order of the addends changed, so this is the Commutative Property of Addition.

Answer: A. Commutative Property

Example 2

Which property is shown? $(6 \times 3) \times 2 = 6 \times (3 \times 2)$

Solution: The grouping (parentheses) changed but the order stayed the same, so this is the Associative Property of Multiplication.

Answer: A. Associative Property

Example 3

Which property is shown? $47 + 0 = 47$

Solution: Adding 0 does not change the value, so this is the Identity Property of Addition.

Answer: A. Identity Property

Write About the Math

The Writing Revolution

I can explain my reasoning using the words commutative property, associative property, and identity property.

1. Kernel Sentence subject + verb

Model: Associative Property is you can change the grouping and get the same answer.
Propiedad asociativa es puedes cambiar la agrupación y obtener la misma respuesta.

Write a kernel sentence about associative property. Use a subject and a verb.

Escribe una oración base sobre propiedad asociativa. Usa un sujeto y un verbo.

2. Sentence Expansion because · but · so

Kernel: Associative Property matters in math
Propiedad asociativa importa en matemáticas

Expand the kernel three ways. Add a reason, a contrast, and a result.

because
porque

Associative Property matters in math because ____.
Propiedad asociativa importa en matemáticas porque ____.

but
pero

Associative Property matters in math, but ____.
Propiedad asociativa importa en matemáticas, pero ____.

so
entonces

Associative Property matters in math, so ____.
Propiedad asociativa importa en matemáticas, entonces ____.

3. Sentence Types 4 ways to write a math idea

Statement
Afirmación

Tell one true fact about associative property.
Di un hecho verdadero sobre associative property.

Associative property ____.

Question
Pregunta

Ask a question about associative property.
Haz una pregunta sobre associative property.

How does ____ ?

¿Cómo ____ ?

Exclamation
Exclamación

Show excitement about associative property.
Muestra entusiasmo sobre associative property.

Wow, ____ !

¡Guau, ____ !

Command
Mandato

Tell a partner what to do with associative property.
Dile a un compañero qué hacer con associative property.

First, ____ .

Primero, ____ .

4. Explain Your Reasoning use a sentence starter

I used the ____ **property.**

Usé la propiedad ____.

It works because ____.

Funciona porque ____.

This makes math easier when ____.

Esto facilita las matemáticas cuando ____.

Try It

Solve on your own. Check the answer key when you are done.

1. Which property is shown? $47 + 0 = 47$

- A. Identity Property
- B. Commutative Property
- C. Associative Property
- D. Distributive Property

Show your work:

2. Which property lets you rearrange 8×5 to 5×8 ?

- A. Commutative Property
- B. Associative Property
- C. Identity Property
- D. Distributive Property

Show your work:

Stretch Your Thinking

Level 2 enrichment

Challenge task — explain your reasoning in full sentences.

Explain why the commutative property works for addition and multiplication but NOT for subtraction and division. Give a specific number example for each operation to prove your point.

Sentence starter: Addition: $___ + ___ = ___ + ___ = ___ (works)$. Subtraction: $___ - ___ \neq ___ - ___$ because $___$. Multiplication: $___ \times ___ = ___ \times ___ = ___ (works)$. Division: $___ \div ___ \neq ___ \div ___$ because $___$.

Show your work:

Reflect — Exit Ticket

Which property is shown? $(8 + 5) + 2 = 8 + (5 + 2)$

- A. Associative Property
- B. Commutative Property
- C. Identity Property
- D. Distributive Property

Your answer:

Answer Key & Teacher Guide

1. **Try It 1:** A. Identity Property — *Adding 0 does not change the value, so this is the Identity Property of Addition.*
2. **Try It 2:** A. Commutative Property — *Changing the order of factors is the Commutative Property of Multiplication.*
3. **Exit Ticket:** A. Associative Property — *The grouping (parentheses) changed but the numbers stayed in the same order, so this is the Associative Property of Addition.*

Writing (TWR) — what to look for

- **Kernel sentence:** A complete sentence needs a subject and a verb. Example: Associative Property is you can change the grouping and get the same answer.
- **Expansion:** *because* gives a reason, *but* shows a contrast or exception, *so* shows a result. Answers vary; each must keep the kernel idea and add the correct kind of detail.
- **Sentence types:** Statement ends with a period, question with "?", exclamation with "!", and a command starts with an action verb (a "bossy" verb).