

Commutative property

A number property is a rule which can be used to help you remember some of your basic facts.

When adding two whole numbers, the order does not affect the result.

$$\begin{array}{c} \bigcirc \bigcirc \bigcirc \\ 3 \end{array} + \begin{array}{c} \bigcirc \bigcirc \\ 2 \end{array} = 5$$

and

$$\begin{array}{c} \bigcirc \bigcirc \\ 2 \end{array} + \begin{array}{c} \bigcirc \bigcirc \bigcirc \\ 3 \end{array} = 5$$

Addition is commutative.

When multiplying two whole numbers, the order does not affect the result.

$$\begin{array}{|c|c|c|c|} \hline & 4 & & \\ \hline 3 & & & \\ \hline & & & \\ \hline & & & \\ \hline \end{array} \quad \text{and} \quad \begin{array}{|c|c|c|} \hline & & \\ \hline & & \\ \hline & & \\ \hline & & \\ \hline \end{array}$$

$3 \times 4 = 12$ $4 \times 3 = 12$

Multiplication is commutative.

Which of the following activities are commutative?

1. putting on a hat then a coat
2. buying a pencil then using the pencil
3. putting on a shirt then a sweater
4. putting on a left shoe then a right shoe

5. Interchange the numbers in each of the following. In which were the results the same?

- a) $3 + 5$ b) 7×9 c) $5 - 4$ d) $12 \div 3$

6. Which operations are commutative for the set of whole numbers?

- a) addition. b) division c) multiplication d) subtraction

Indicate which of the following are true. Do not find the answer.

7. $8 + 6 = 6 + 8$ 8. $3 \times 8 = 8 \times 3$ 9. $7 \cdot 6 = 6 \cdot 7$
10. $425 + 36 = 36 + 425$ 11. $48 \div 4 = 4 \div 48$ 12. $24 - 8 = 8 - 24$

Fill in the blanks to make each statement true.

13. $5 \times 7 = 7 \times \underline{\quad}$ 14. $8 \cdot \underline{\quad} = 4 \cdot 8$ 15. $11 + 13 = 13 + \underline{\quad}$
16. $36 + \underline{\quad} = 12 + 36$ 17. $a + b = b + \underline{\quad}$ 18. $a \cdot b = \underline{\quad} \cdot a$
(a and b stand for any whole number)

19. Add. Check using the commutative property.

$$\begin{array}{r} 57 \\ + 89 \\ \hline \end{array} \quad \text{Check:}$$

20. Multiply. Check using the commutative property.

$$\begin{array}{r} 23 \\ \times 14 \\ \hline \end{array} \quad \text{Check:}$$

Associative property

When adding three whole numbers, the result is the same no matter how the numbers are grouped. The parentheses show which grouping is to be done first.

$$(3+2)+4 = 3+(2+4)$$

$$5 + 4 = 3 + 6$$

$$9 = 9$$

Addition is associative.

When multiplying three whole numbers, the result is the same no matter how the numbers are grouped.

$$(3 \times 2) \times 4 = 3 \times (2 \times 4)$$

$$6 \times 4 = 3 \times 8$$

$$24 = 24$$

Multiplication is associative.

Show that these sentences are true. The operation inside the parentheses must be done first.

1. $(5 + 4) + 3 = 5 + (4 + 3)$
____ + ____ = ____ + ____
____ = ____

2. $(6 \cdot 4) \cdot 5 = 6 \cdot (4 \cdot 5)$
____ \cdot ____ = ____ \cdot ____
____ = ____

3. $(28 + 14) + 16 = 28 + (14 + 16)$
____ + ____ = ____ + ____
____ = ____

4. $(8 \times 3) \times 10 = 8 \times (3 \times 10)$
____ \times ____ = ____ \times ____
____ = ____

Fill in the blanks so each statement is true.

5. $(6 + 2) + 3 = 6 + (2 + \underline{\quad})$

6. $(4 + 7) + 3 = 4 + (\underline{\quad} + 3)$

7. $(8 \times 3) \times 2 = \underline{\quad} \times (3 \times 2)$

8. $(3 \cdot 5) \cdot 2 = 3 \cdot (\underline{\quad} \cdot 2)$

9. $(a + b) + c = a + (\underline{\quad} + c)$

10. $(a \cdot b) \cdot c = a \cdot (b \cdot \underline{\quad})$

Which of the following are true?

11. $5 + 2 = 2 + 5$

12. $5 - 2 = 2 - 5$

13. $5 \cdot 2 = 2 \cdot 5$

14. $5 \div 2 = 2 \div 5$

15. $(5 + 6) + 3 = 5 + (6 + 3)$

16. $(9 - 3) - 1 = 9 - (3 - 1)$

17. $(2 \cdot 7) \cdot 3 = 2 \cdot (7 \cdot 3)$

18. $(12 \div 6) \div 2 = 12 \div (6 \div 2)$

A) Is subtraction associative?
Give an example to prove your answer.

B) Is division associative?
Give an example to prove your answer.