

**Warmup:** Show each step on paper, then check your answer on the website.

1.  $2 + 3 + 8 + 7 =$

2.  $2 + 8 + 3 + 7 =$

**Equivalent Expressions:**

3. Multiply:  $5 \times 3 \times 4 \times 2 =$

4. Multiply:  $5 \times 2 \times 3 \times 4 =$

5. True or False:  $10 \div 2 = 2 \div 10$

6. True or False:  $7 - 3 = 3 - 7$

7. Calculate  $5 + 0 =$

8. Calculate  $12 \cdot 1 =$

9. Calculate  $8 \cdot 0 =$

10.  $y + \underline{\hspace{2cm}} = y$

### I. Commutative Property of Addition and Multiplication.

#### **Commutative Property of Addition:**

the order in which numbers are added does not change their sum.



$3 + 6 = \underline{\hspace{1cm}} + 3$

$\underline{\hspace{1cm}} + 4 = 4 + b$

#### **Commutative Property of**

**Multiplication:** the order in which numbers are multiplied does not change their product.



$7 \cdot 3 = \underline{\hspace{1cm}} \cdot 7$

$\underline{\hspace{1cm}} \cdot 8 = 8 \cdot b$

11.  $2 + 4 = 4 + \underline{\hspace{2cm}}$

12.  $\underline{\hspace{2cm}} \cdot 6 = 6 \cdot 5$

13.  $x + \underline{\hspace{1cm}} = y + x$

14.  $x \cdot y = y \cdot x$

## II. Associative Property of Addition and Multiplication.

### Associative Property of

**Addition:** the grouping of the addends does not change their sum.



### Associative Property of

**Multiplication:** the grouping of the factors does not change their product.

$$(2 + 4) + 6 = \underline{\hspace{1cm}} + (4 + 6)$$

$$(3 \cdot 5) \cdot 2 = 3 \cdot (5 \cdot 2) =$$

$$18. (c+9)+15$$

$$(y \cdot 2) \cdot 3 = y \cdot (2 \cdot 3) =$$

$$(a + 5) + 6 =$$

$$16. (5 + \underline{\hspace{1cm}}) + 2 = 5 + (8 + 2)$$

$$17. (6 \cdot 4) \cdot \underline{\hspace{1cm}} = 6 \cdot (4 \cdot 5)$$

## III. Identity Properties of Addition and Multiplication.

### Identity Property of

**Addition:** The sum of an addend and zero is the addend.



### Identity Property of

**Multiplication:** The product of a factor and one is the factor.

$$5+0 =$$

$$\underline{\hspace{1cm}} + 9 = 9$$

$$4(1) =$$

$$(\underline{\hspace{1cm}})x = x$$

$$a + \underline{\hspace{1cm}} = a$$

## IV. Multiplicative Property of Zero.

### Multiplicative Property of Zero:

The product of a factor and zero is zero.

$$3(0) =$$

$$(\underline{\hspace{1cm}})x = 0$$

$$a(\underline{\hspace{1cm}}) = 0$$

## V. Mixed Review of Properties

29

Commutative Property of Addition:  $4 + 5 = \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$

Associative Property of Addition:  $(4 + 5) + 6 = \underline{\hspace{1cm}} + (\underline{\hspace{1cm}} + \underline{\hspace{1cm}})$

Identity Property of Addition:  $4 + \underline{\hspace{1cm}} = 4$

Multiplicative Property of Zero:  $4 \times \underline{\hspace{1cm}} = 0$

Commutative Property of Multiplication:  $4 \times 5 = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}}$

Associative Property of Multiplication:  $(4 \times 5) \times 6 = \underline{\hspace{1cm}} \times (\underline{\hspace{1cm}} \times \underline{\hspace{1cm}})$

Identity Property of Multiplication:  $4 \times \underline{\hspace{1cm}} = 4$

30

31

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33

## VI. Practice

35

36

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47