3.3 Properties of Addition and Multiplication

ESSENTIAL QUESTION

Does the order in which you perform an operation matter?

1

2

COMMON CORE STATE STANDARDS

6.EE.3 Apply the properties of operations to generate equivalent expressions.

6.EE.4 Identify when two expressions are equivalent.

Expressions with the same value, like 12 + 7 and 7 + 12 are EQUIVALENT EXPRESSIONS

3

Δ



COMMUTATIVE PROPERTIES

Changing the order of addends or factors does not change the sum or product.

Numbers 5+8=8+5 5x8=8x5

Algebra a+b=b+a

axb=bxa

€ Key Ideas

ASSOCIATIVE PROPERTIES

Changing the grouping of addends or factors does not change the sum or product. $% \label{eq:change_product} % \label{eq:change} % \label{eq:chan$

Numbers (7+4)+2=7+(4+2)

 $(7 \times 4) \times 2 = 7 \times (4 \times 2)$

Algebra (a+b)+c=a+(b+c)

 $(a \times b) \times c = a \times (b \times c)$

5



ADDITION PROPERTY OF ZERO

The sum of any number and 0 is that number.

Numbers 7+0=7

Algebra a+0=a

€ Key Ideas

MULTIPLICATION PROPERTY OF ZERO The product of any number and 0 is 0.

Numbers $9 \times 0 = 0$

Algebra ax0=0

7

8



MULTIPLICATION PROPERTY OF ONE

The product of any number and 1 is that number.

Numbers $4 \times 1 = 4$

Algebra ax1=a

EXAMPLE 1 Using Properties to Write Equivalent Expressions

a. Simplify the expression 7 + (12 + x).

19 +x

9

10

b. Simplify the expression (6.1 + x) + 8.4.

c. Simplify the expression 5(11y).

11



Simplify the expression.

1.
$$10 + (a + 9)$$

13

On Your Own

2.
$$\left(c+\frac{2}{3}\right)+\frac{1}{2}$$

$$C+\left(\frac{2}{3}+\frac{1}{2}\right)$$

+ 6 = 5

14

16

on Your Own

Simplify the expression.

3. 5(4n)

15

EXAMPLE (2) Using Properties to Write Equivalent Expressions

a. Simplify the expression $9 \cdot 0 \cdot p$.

b. Simplify the expression $4.5 \cdot r \cdot 1$.

On Your Own

Simplify the expression.

4. 12 · b · 0

17



on Your Own

Simplify the expression.

on Your Own

Simplify the expression.

6.
$$(t+15)+0$$

+ + $(5+0)$
+ + $(5+0)$

19

20

EXAMPLE (3) Real-Life Application

You and six friends play on a basketball team. A sponsor paid \$100 for the league fee, x dollars for each player's T-shirt, and \$68.25 for trophies. Write an expression for the total amount the sponsor paid.



On Your Own

7. WHAT IF? In Example 3, your sponsor paid \$54.75 for trophies. Write an expression for the total amount the sponsor paid.

Properties of Addition and Multiplication PROPERTIES the ____ of addends or factors ____ change the sum or product. Numbers: Algebra: PROPERTIES the _____ of addends or factors ____ change the sum or product. Numbers: Algebra: _____PROPERTY OF _____ The _____ of any number and ____ is that _____. Numbers: Algebra: _____PROPERTY OF _____ The ______of any number and ____is 0. Numbers: Algebra: _____PROPERTY OF _____ The _____ of any number and ___ is that number. Numbers:

Algebra: