Name _____

Properties

Florida's B.E.S.T.

- **Algebraic Reasoning** 5.AR.2.2, 5.AR.2.3
- **Number Sense & Operations** 5.NSO.2.4
- **Mathematical Thinking & Reasoning** MTR.4.1, MTR.5.1

I Can use properties of operations to solve problems.

You can use the properties of operations to help you evaluate numerical expressions more easily.

Properties of Addition

Commutative Property of Addition If the order of addends changes, the sum stays the same.	$12.05 + 7.20 = 7.20 + 12.05$
Associative Property of Addition If the grouping of addends changes, the sum stays the same.	$5 + (8 + 14) = (5 + 8) + 14$
Identity Property of Addition The sum of any number and 0 is that number.	$\frac{1}{3} + 0 = \frac{1}{3}$

Properties of Multiplication

Commutative Property of Multiplication If the order of factors changes, the product stays the same.	$\frac{1}{8} \times \frac{1}{4} = \frac{1}{4} \times \frac{1}{8}$
Associative Property of Multiplication If the grouping of factors changes, the product stays the same.	$11 \times (3 \times 6) = (11 \times 3) \times 6$
Identity Property of Multiplication The product of any number and 1 is that number.	$\frac{1}{2} \times 1 = \frac{1}{2}$

UNLOCK the Problem Real World

The table shows the number of bones in several parts of the human body. What is the total number of bones in the ribs, the skull, and the spine?

Part	Number of Bones
Ankle	7
Ribs	24
Skull	28
Spine	26

To find the sum of addends using mental math, you can use the Commutative and Associative Properties.

Use properties to find 24 + 28 + 26.

$24 + 28 + 26 = 28 + $ _____ $+ 26$ Use the _____ Property to reorder the addends.

$= 28 + (24 +$ _____ $)$ Use the _____ Property to group the addends.

$= 28 +$ _____ Use mental math to add.

$=$ _____

So, there are _____ bones in the ribs, the skull, and the spine.

Math Talk

MTR 5.1 Use patterns and structure.

Explain why grouping 24 and 26 makes the problem easier to solve.

Distributive Property

Multiplying a sum by a number is the same as multiplying each addend by the number and then adding the products. The expression on the left of the equal sign will always be equivalent to the expression on the right. This is true for all the properties of operations, which are also called the ***properties of equality***.

$5.6 \times (7.2 + 9.1) = (5.6 \times 7.2) + (5.6 \times 9.1)$

$5.6 \times (16.3) = (40.32) + (50.96)$

$91.28 = 91.28$

The expressions on both sides of the equal sign are equivalent, so the equation is true.

The Distributive Property can also be used with multiplication and subtraction. For example, $2 \times (10 - 8) = (2 \times 10) - (2 \times 8)$.

Example 1 Use the Distributive Property to find the product.

One Way Use addition.

$8 \times 59 = 8 \times (\_\_\_\_\_ + 9)$ Use a multiple of 10 to write 59 as a sum.

$= (\_\_\_\_\_ \times 50) + (8 \times \_\_\_\_\_)$ Use the Distributive Property.

$= \_\_\_\_\_ + \_\_\_\_\_$ Use mental math to multiply.

$= \_\_\_\_\_$ Use mental math to add.

Another Way Use subtraction.

$8 \times 59 = 8 \times (\_\_\_\_\_ - 1)$ Use a multiple of 10 to write 59 as a difference.

$= (\_\_\_\_\_ \times 60) - (8 \times \_\_\_\_\_)$ Use the Distributive Property.

$= \_\_\_\_\_ - \_\_\_\_\_$ Use mental math to multiply.

$= \_\_\_\_\_$ Use mental math to subtract.

Example 2 Complete the equation, and tell which property you used.

A $\frac{2}{3} \times \_\_\_\_\_ = \frac{2}{3}$

Think: A number times 1 is equal to itself.

Property: _____

_____

B $4.7 \times 1.5 = 1.5 \times \_\_\_\_\_$

Think: Changing the order of factors does not change the product.

Property: _____

_____

Math Talk

MTR 4.1 Engage in discussions on mathematical thinking.

Describe how to use the Distributive Property to find the product 3×29.9.