

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

**Translating Between Words and Math: To Group or Not To Group?**

**Essential Question:** When do we need to use grouping symbols, such as parenthesis, when translating from words to math expressions?

**WARM UP: Translate each phrase into an algebraic expression.**

- The sum of  $w$  and 8.  $w + 8$
- The difference of 21 and  $h$ .  $21 - h$
- The product of  $p$  and 12.  $12p, 12 \cdot p, 12 \times p, 12(p)$
- The quotient of 36 and  $x$ .  $\frac{36}{x}, 36/x, 36 \div x$

**Explore:** What happens if we multiply 10 times each expression above, with and without grouping symbols around the expression.

	Without Grouping the Expression 10 • original expression	Group the Expression Using ( ) 10 • ( expression )
1) Let $w = 2$	$10 \cdot 2 + 8$ $= 28$	$10 \cdot (2 + 8)$ $100$
2) Let $h = 7$	$10 \cdot 21 - 7$ $203$	$10 \cdot (21 - 7)$ $140$
3) Let $p = 3$	$10 \cdot 12 \cdot 3$ $360$	$10 \cdot (12 \cdot 3)$ $360$
4) Let $x = 6$	$10 \cdot \frac{36}{6}$ $60$	$10 \cdot (\frac{36}{6})$ $60$

**Explain:** How are the keywords (sum, difference, product and quotient) from the phrases in the warm up related?  
The answer to a specific problem.

**Elaborate:** How are the following expressions alike and how are they different? Think about how each expression is affected by order of operations.

Example A:  $5 \cdot b - 4$  Example B:  $5 \cdot (b - 4)$

Which expression above shows a product being decreased by 4?  $5 \cdot b - 4$

Which expression above shows the product of two factors?  $5(b - 4)$

**Evaluate each expression for  $b = 10$ .** Are the expressions equivalent?  
Example A:  $5 \cdot b - 4$  Example B:  $5 \cdot (b - 4)$

$46$   $30$

**Write a word phrase for each expression above:**

$5 \cdot b - 4$  Five times the difference of  $b$  and 4

$5 \cdot (b - 4)$  Five times the quantity of  $b$  minus 4

List some keywords that let us know that part of an expression will be grouped in parenthesis:

---

**Write your own math expression using grouping symbols to represent each keyword:**

Sum: \_\_\_\_\_ Difference: \_\_\_\_\_

Product: \_\_\_\_\_ Quotient: \_\_\_\_\_

Sum of two products: \_\_\_\_\_

Quotient of two sums: \_\_\_\_\_

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

**Independent Practice: Translating Between Words and Math**

**Translate each phrase into an expression:**

- The sum of 12 and  $n$  divided by 4 \_\_\_\_\_
- The quantity of 27 divided by 9, increased by 13 \_\_\_\_\_
- 7 times the difference of 16 and  $m$  \_\_\_\_\_
- 4 times the quotient of 50 and 10 \_\_\_\_\_
- The quantity of  $k$  plus 19, increased by the product of 5 and  $g$  \_\_\_\_\_

**Translate the expression into words:**

- $4 \cdot (w - 9)$  \_\_\_\_\_
- $(6 + n) \div 4$  \_\_\_\_\_
- $12(8 + y)$  \_\_\_\_\_

**Explore Expressions Involving ONLY Multiplication and Division:**  
Evaluate (simplify) each expression using order of operations.

$6 \cdot 10 \div 2$        $10 \times 2 \cdot 6$        $6 \cdot (10 \div 2)$

Why do you think the result was the same for each expression?

Do you think the same would be true for expressions involving ONLY addition & subtraction?