

Where Do They Go?

Parentheses and Order of Operations

Wayne's teacher gave his class a list of expressions to evaluate. When Wayne checked his answers, he found that all of his answers were wrong. He thought that possibly one set of parentheses had accidentally been left out of each expression. After several tries with each expression, he found where the parentheses should be placed to get the correct answer. Can you determine where the parentheses should go in the following expressions to get the answer given?

<input type="radio"/>	$13 + 21 \cdot -42 = 162$
<input type="radio"/>	$17 + 25 - 36 \div 3 = -16$
	$49 \div 5 + 2 - 63 = -56$
	$63 + 42 \div 7 \cdot 42 = 66$
<input type="radio"/>	$94 - 13 + 16 - 19 = 83$
	$12 + 36 \div 8 - 23 = -17$
	$28 - 12^2 \cdot 5 + 177 = -403$
	$35 - 16 + 80 \cdot 15 = -1405$
<input type="radio"/>	$64 + 36 \div 3 + 2 = 71.2$
	$918 \div 4 + 2 \cdot 4 = 612$

Thinking Cap

Write some expressions using one set of parentheses. Then write your expressions without parentheses, and exchange with a classmate. Determine where the parentheses should be placed in your classmate's expressions.

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Objective: To use the calculator to evaluate expressions containing parentheses.

NCTM Standards: Mathematics as Reasoning; Number and Number Relationships

Using this Activity

Students use the calculator in this activity to evaluate expressions containing parentheses.

The $\left(\frac{x-y}{}$ and $\left(\frac{1}{x}\right)$ keys can be used to group terms in an expression.

Example To determine where the parentheses should be placed in the first expression, experiment with parentheses in different positions until the correct placement is found. Evaluate the expression $(13 + 21) \cdot 6 - 42$ by entering $(13 + 21) 6 \times 42 =$. The number display is 162, the desired result.

Assessment Students should check the placement of the parentheses in each expression by first evaluating the expression in the parentheses and storing the result in memory. Then they should evaluate the expression using this result in place of the expression in the parentheses. If the placement is correct, the answer should be the one given.

Answers

$$\begin{aligned} (13 + 21) \cdot 6 - 42 \\ 17 + (25 - 36) \cdot 3 &= -16 \\ 49 \div (5 + 2) - 63 &= -56 \\ 63 + 42 \div (7 \cdot 2) + 66 \\ 94 - (13 + 16 - 18) &= 83 \\ (12 + 36) \div 8 - 23 &= -17 \\ (28 - 12^2) \cdot 5 + 177 &= -403 \\ 35 - (16 + 80) \cdot 15 &= -1405 \\ 64 + 36(3 + 2) &= 71.2 \\ 918 \div (4 + 2) \cdot 4 &= 612 \end{aligned}$$

Thinking Cap

Answers may vary. See students' work.