

Core Content

Cluster Title: Write and interpret numerical expressions.
Standard 2: Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
MASTERY Patterns of Reasoning:
<p>Conceptual: Students will understand that the word “then” implies one operation happens after another and parentheses are used to indicate the order of operations. Example: “Add 8 and 7, then multiply by 2” can be written as $(8 + 7) \times 2$. Students will understand how to write a real-world problem as an expression. Students will recognize that $3 \times (18,932 + 921)$ is three times as large as $18,932 + 921$, without having to solve. Students will recognize that $3(18,932 + 921)$ means the same thing as $3 \times (18,932 + 921)$.</p> <p>Procedural: Students can write expressions using the correct numerical and symbolic notation in the proper order.</p> <p>Representational: Students can use numerical and symbolic notation to represent an expression from a problem.</p>

Supports for Teachers

Critical Background Knowledge
<p>Conceptual: Students will understand the rules of the order of operations, especially the use of parentheses.</p> <p>Procedural: Students can record single-step expressions not involving parentheses or brackets.</p> <p>Representational: Students can represent simple operations using the proper notation (+, -, \times, \div).</p>
Academic Vocabulary and Notation
expression, parentheses, bracket, brace, order of operations, terminology for operations (e.g. sum, add, multiply, difference), “then”

Instructional Strategies Used	Resources Used
<p>Introduce this concept by providing students with a variety of real-world situations in which multi-step calculations occur.</p> <p>Ask them to use their understanding of operations and notations to express the situation mathematically. For example, “Jan purchased 8 pencils for school. She later decided she needed 7 more. She has made the same purchase at the beginning of school for the last 6 years. Show how many pencils she has purchased with a numeric expression.”</p> <p style="text-align: center;">Expression: $(8+7) \times 6$</p> <p>Give the students an expression and see if they can come up with a real-world situation that would match.</p> <p>Use a math picture book to present different problems. Stop at various points to have students write an expression that matches the situation in the book.</p>	<p>http://illuminations.nctm.org/LessonDetail.aspx?id=L803</p> <p><i>Alexander, Who Used to Be Rich Last Sunday</i> by Judith Viorst</p> <p><i>The Grapes of Math</i> by Greg Tang</p>

Assessment Tasks Used	
<p>Skill-Based Task: Students write an expression for calculations given in words such as the following: “Divide 144 by 12, and then subtract 7.” They write $(144 \div 12) - 7$.</p>	<p>Problem Task: Mara bought 6 bags of Skittles at \$0.85 each and 9 packs of gum at \$1.20 each for a sleepover. Express what she purchased mathematically. Answer: $(6 \times 0.85) + (9 \times 1.20)$ Extension: Mara bought 6 bags of Skittles at \$0.85 each and 9 packs of gum at \$1.20 each for a sleepover. She still didn't think she would have enough snacks. She went to the store the next day and bought the same number of items again. Express what she purchased mathematically. Answer: $2 \times [(6 \times 0.85) + (9 \times 1.20)]$ or $2 [(6 \times 0.85) + (9 \times 1.20)]$ Explain your reasoning. How do you know your expression fits the problem?</p>