Practice Task: Expression Puzzle

In this task, students will practice interpreting numeric expressions by matching the numeric form to its meaning written in words, without evaluating the expression.

STANDARDS FOR MATHEMATICAL CONTENT

MCC.5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

STANDARDS FOR MATHEMATICAL PRACTICE

SMP 1. Make sense of problems and persevere in solving them.
SMP 2. Reason abstractly and quantitatively.
SMP 3. Construct viable arguments and critique the reasoning of others.
SMP 6. Attend to precision.

BACKGROUND KNOWLEDGE

Students should have had prior experiences writing expressions. In this task, students will practice matching an expression written as a numeric calculation to its written form in words. In order to do this, students will need to be able to use and apply the commutative and associative properties of addition and multiplication as well as the correct order of operations. They will also need to apply third grade standard MCC3.NF.1 by understanding that dividing by a whole number is the same as multiplying by a unit fraction with that whole number as its denominator. For example, one-half of a quantity is the same as dividing by two, and one-third of a quantity is the same as dividing by three.

COMMON MISCONCEPTIONS

- Students may choose the wrong operation because they don't fully understand the meaning of each of the four operations and the vocabulary associated with each operation. Reviewing contexts for each operation and vocabulary such as product, sum, difference, etc. before doing this activity may be helpful.
- Students may try to match the numbers in an expression to the word forms of those numbers. The puzzle has been written with distractors that use the same numbers in different operations. Therefore, students will need to carefully consider the correct operation and order when selecting the matching puzzle piece.

ESSENTIAL QUESTIONS

- How can an expression be written?

MATERIALS

- Directions and questions sheet for Expression Puzzle
- Expression Puzzle sheet (may be printed on cardstock and laminated; should be cut into 15 puzzle pieces
- Teacher answer key

GROUPING

Individual or partner task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Comments

This task will allow students to practice interpreting numeric expressions in words without evaluating them. They will practice matching expressions written in words to the expressions written symbolically by completing a puzzle.

Task Directions

Students will follow the directions below from the student Directions and Questions sheet.

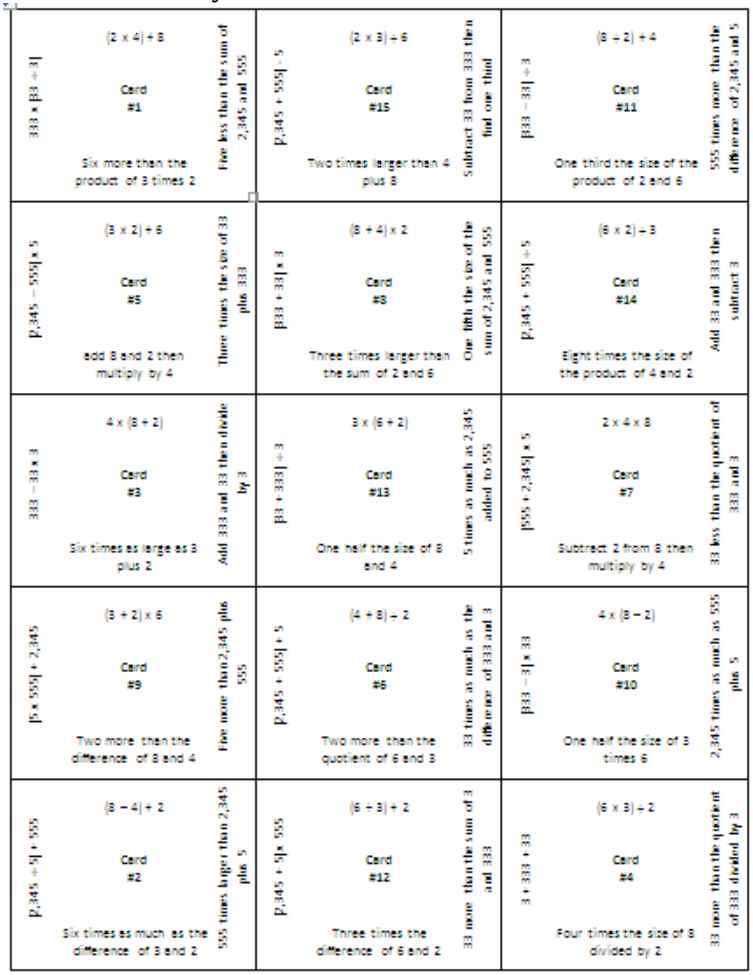
Directions:

- Complete the puzzle by matching the edge of each puzzle piece. If the edge has an expression that is written with numerically with symbols, then it should be matched to a written description of the expression. If the edge is written in words, then it needs to be matched to its symbolic representation.
- When the puzzle is completed, it will form one large rectangle.
- Some expressions do not have a match. Those expressions will be located on the outside perimeter of the puzzle.
- Be careful! Matching the correct operations and order of those operations is equally important as matching the words and numbers on the puzzle pieces. There are distractors that use the same numbers but have incorrect operations or order.
- As you decide which puzzle pieces go together, you and your partner or group members should discuss why the pieces will or will not fit together.

After completing the puzzle, answer the following questions.

4. How did you decide which cards matched?
5. What did you consider as decided why puzzle pieced did or did not fit together?
6. Give an example of when you used the commutative property. Explain how the commutative property is used in your example.
7. Give an example of when you used the associative property. Explain how the associative property is used in your example.
8. Give an example of when you had to pay attention to using the correct order of operations. Explain why this was important in your example.
9. In card #11, what operation did you use to represent one third? Explain why this operation worked.

Task Answer Key



FORMATIVE ASSESSMENT QUESTIONS

- The questions listed above on the student directions and questions sheet are the formative assessment questions for this task.

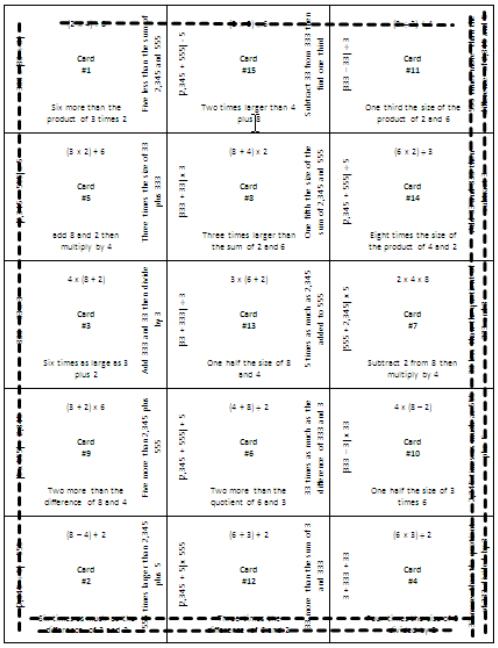
DIFFERENTIATION

Extension

- Students can solve each expression.
- Students can determine which expressions would have the same value if the grouping symbols are removed.
- Students can create their own expression puzzle.

Intervention

- Modify puzzle to use expressions that only include operations, not parentheses.
- Tell students that puzzle card #1 is should be located in the top left-hand corner of the puzzle and that puzzle card #2 is not the next puzzle piece.
- Find sets of 2 cards that match instead of completing the entire puzzle.
- Reduce the number of puzzle pieces.
- Remove the distractors that do not have matches from the outside of the puzzle as shown below.



Name _____ Date _____

Expression Puzzle

Directions:

- Complete the puzzle by matching the edge of each puzzle piece. If the edge has an expression that is written with numerically with symbols, then it should be matched to a written description of the expression. If the edge is written in words, then it needs to be matched to its symbolic representation.
- When the puzzle is completed, it will form one large rectangle.
- Some expressions do not have a match. Those expressions will be located on the outside perimeter of the puzzle.
- Be careful! Matching the correct operations and order of those operations is equally important as matching the words and numbers on the puzzle pieces. There are distractors that use the same numbers but have incorrect operations or order.
- As you decide which puzzle pieces go together, you and your partner or group members should discuss why the pieces will or will not fit together.

After completing the puzzle, answer the following questions.

1. How did you decide which cards matched?

_____
_____
_____

2. What did you consider as decided why puzzle pieced did or did not fit together?

_____
_____
_____

3. Give an example of when you used the commutative property. Explain how the commutative property is used in your example.

_____
_____

4. Give an example of when you used the associative property. Explain how the associative property is used in your example.

_____
_____

5. Give an example of when you had to pay attention to using the correct order of operations. Explain why this was important in your example.

_____
_____

6. In card #11, what operation did you use to represent one third? Explain why this operation worked.

_____
_____

Teacher note: The puzzle pieces for this task are located on this page and the next page. They should be cut out into 15 pieces before doing the puzzle. The puzzle pieces could be copied on card stock and laminated for durability and future use.

333 x (33 ÷ 3)	(2 x 4) + 8 **Card #1** Six more than the product of 3 times 2	Five less than the sum of 2,345 and 555
(2,345 + 555) - 5	(2 x 3) ÷ 6 **Card #15** Two times larger than 4 plus 8	Subtract 33 from 333 then find one third
(333 – 33) ÷ 3	(8 ÷ 2) + 4 **Card #11** One third the size of the product of 2 and 6	555 times more than the difference of 2,345 and 5
(2,345 – 555) x 5	(3 x 2) + 6 **Card #5** Add 8 and 2 then multiply by 4	Three times the size of 33 plus 333
(333 + 33) x 3	(8 + 4) x 2 **Card #8** Three times larger than the sum of 2 and 6	One fifth the size of the sum of 2,345 and 555
(2,345 + 555) ÷ 5	(6 x 2) ÷ 3 **Card #14** Eight times the size of the product of 4 and 2	Add 33 and 333 then subtract 3
333 – 33 x 3	4 x (8 + 2) **Card #3** Six times as large as 3 plus 2	Add 333 and 33 then divide by 3
(33 + 333) ÷ 3	3 x (6 + 2) **Card #13** One half the size of 8 and 4	5 times as much as 2,345 added to 555
(555 + 2,345) x 5	2 x 4 x 8 **Card #7** Subtract 2 from 8 then multiply by 4	33 less than the quotient of 333 and 3

(5 x 555) + 2,345 (3 + 2) x 6 **Card #9** Two more than the difference of 8 and 4 Five more than 2,345 plus 555	(2,345 + 555) + 5 (4 + 8) ÷ 2 **Card #6** Two more than the quotient of 6 and 3 33 times as much as the difference of 333 and 3	(333 – 3) x 33 4 x (8 – 2) **Card #10** One half the size of 3 times 6 2,345 times as much as 555 plus 5
(2,345 ÷ 5) + 555 (8 – 4) + 2 **Card #2** Six times as much as the difference of 3 and 2 555 times larger than 2,345 plus 5	(2,345 + 5) x 555 (6 ÷ 3) + 2 **Card #12** Three times the difference of 6 and 2 33 more than the sum of 3 and 333	3 + 333 + 33 (6 x 3) ÷ 2 **Card #4** Four times the size of 8 divided by 2 33 more than the quotient of 333 divided by 3