Lesson 7: Expressions and Equivalency

| Objectives	Terms
• To define what expression means, mathematically. • To identify and write equivalent expressions. • To simplify expressions. • To check your work by using a test value. • To justify your steps.	• Expression • Variable • Equivalent Expression • Simplify • Combine like terms • Distribute • Factoring • Substitute • Justify

Think about this:

Michelle buys two bags of Skittles and puts them into two piles. We can neither increase nor decrease the amount of Skittles she has.
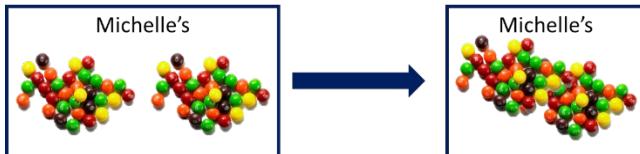
For each scenario, determine if equivalency is maintained (circle yes or no). Then write out the number of bags of Skittles she has using mathematical symbols for each scenario. Use x to represent each bag of Skittles.

Mathematical Representation
Scenario #1
Scenario #2
Scenario #3

Scenario #1: How can you write out the number of bags of Skittles Michelle has mathematically?
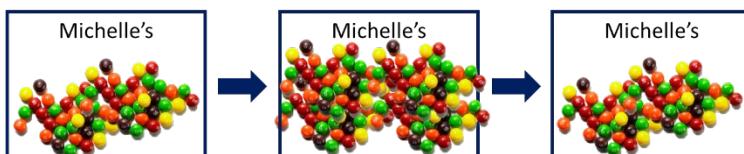
Michelle's

Scenario #2: If Michelle combines her piles together, does she maintain equivalency?

YES/NO

Michelle's
Michelle's

Scenario #3: If Michelle buys enough Skittles to double her pile, but then gives half of her pile to a friend, does she maintain equivalency?

YES/NO

Michelle's
Michelle's
Michelle's

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Definitions

Expressions: _____ or _____ joined by a math operation.

- Variable: is a _____ or a _____ that represents a number.

- Math Operations include:

Examples of Expressions:

$2x + x + 5$

$$\frac{6(3x + 1)}{2}$$

What can we do with an Expression?

- We can _____ an expression to find an equivalent expression by:
  - **Combining like terms:**

  - **Distributing:**

  - **Factoring:**

- Recall: _____ is when you apply mathematical operations to write an expression in the simplest terms.

- We can check our work by:

  - **Substituting** the _____ value into both expressions (ex. x = 5)

  - If we get the same result, then the original expression and the simplified expression are likely _____.

  - When we use x = 5 in each of the expressions on the right, we get the same outcome each time.

Mathematical Representation

Scenario #1

Expression: _____

substitute x = 5

Scenario #2
Combining like terms:
_____ is equivalent to $2x$

substitute x = 5

Scenario #3a
Distributing:
$2(2x - 5)$ is equivalent to _____

substitute x = 5

Scenario #3b
Factoring:
$2x$ is equivalent to $\frac{2x \cdot 2}{2}$ (or _____

substitute x = 5

$\frac{2x \cdot 2}{2}$:

_____

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Practice

1. Use the space below to simplify the expression.

    $5x + 3 - 2x + 6$ **answer: _____**

- We can _____ like terms in an expression because it **maintains equivalency**.
  - Check your work by using the given test value.

  - Show your steps.

  - Are the expressions equivalent?
    - Yes or no?

    > Substitute: x = _____ into $5x + 3 - 2x + 6$
    > & your new expression

2. Use the space below to simplify the expression.

    _____   **answer: _____**

  - Check your work by using the given test value.

  - Show your steps.

  - Are the expressions equivalent?
    - Yes or no?

    > Substitute: x = 2 into _____
    > & your new expression

- We can use the _____ property of multiplication because it **maintains equivalency.**

    Think about this: What does it mean to factor?

- You can think of factoring as _____ distribution.
  - Fill in the arrows to show how you get from one step to the next.

Distributing
$5(x^2 + 3)$
$5x^2 + 15$

Factoring
$5x^2 + 15$
$5(x^2 + 3)$

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Practice

3. Factor the expression.

   _____   **answer: _____**

- Select a test value to check your work.
    - Show your steps.

    - Are the expressions equivalent?
        - Yes or no?

<div style="border:1px dashed;">
Substitute: x =
</div>

Think about this: What does it mean to justify your steps?

Example: Simplify the expression. Make sure to justify each step.

Fill in the mathematical step described.

We can **justify** our steps by _____ what mathematical _____ we completed to simplify given expressions.

Steps	Justification
	Given
	Distribute
	Combine like terms: constants
	Combine like terms: variables

Practice: Simplify the expression.

- Make sure to justify each step.

$$\frac{(6x - 18)}{6}$$

- Use a test value to check your answer.

Where will you see this in upcoming material?	What are the calculator skills you needed?