

Reasoning Algebraically

Math Task: Integers



PART ONE

Directions: For each of the following sets of equations, solve the equation by creating a model using Montessori math materials.

Helpful Hints:

- Consider what each factor represents in a multiplication equation.
- Consider what multiplication means and how to represent that.
- Pay close attention to how the model you create needs to shift or change for each of the equations in the set.

Set 1	Set 2
$3 \cdot 4$	$2 \cdot 5$
$-3 \cdot 4$	$-2 \cdot 5$
$3 \cdot -4$	$2 \cdot -5$
$-3 \cdot -4$	$-2 \cdot -5$

PART TWO:

1. What do you notice about your answers when you multiply a negative integer by a negative integer?
2. Do you think that will always be true? Generate more equations to test your conjecture.
3. How could you adjust your model or representation so that you could prove this would always be true regardless of the numbers?

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SUPPORT FOR PART ONE:

Typical Models:

- groups of red and green gems/beads/counters
- bead bars and negative bead bars from the snake game
- positive and negative charges

Teacher Prompts:

- What does multiplication mean?
- How can you represent multiplication as groups?
- How can you represent multiplication as an array / area?
- Which materials did you use when you first learned multiplication?
- Which tools have you used before when working with negatives?
- What would it mean to have negative groups?
- If you are “taking away groups,” what are we taking them away from? I thought we started with 0 / nothing?
- Is there a way to represent that you start with zero that still allows you to take things away?
- What does the negative sign indicate here? How can you represent that?
- Where is the $[-3]$ in your model? Where is the $[-4]$?