Addition Strategies: Rearranging to Make Bases (RMB)

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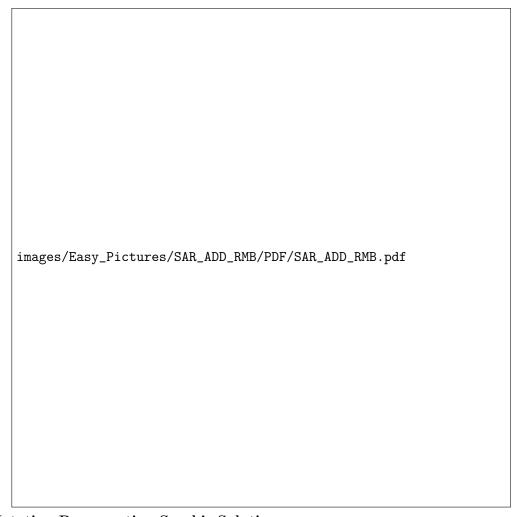**Transcript**

Video from **Carpenter1999<empty citation>**. Strategy descriptions and examples adapted from **HackenbergCourseNotes<empty citation>**.

- **Teacher:** Lucy is eight fish. She buys five more fish. How many fish will Lucy have then?

- **Sarah:** 13.

- **Teacher:** How'd you get 13?

- **Sarah:** Well, because eight plus two is ten, but then two plus three is five. And she wants to buy five more fish. So you take care of two, and you need to add three more. And so I add three more, and you get 13.

Notation Representing Sarah's Solution:

$$8 + 5 = \square$$
$$8 + 2 = 10$$
$$2 + 3 = 5$$
$$8 + 5 = 10 + 3$$
$$8 + 5 = 13$$

Description of Strategy:

Objective: Rearranging to Make Bases (RMB) means shifting the extra ones from one addend over to the other so that one of the numbers becomes a complete multiple of the base (a whole "group" of that base). This rearrangement simplifies the addition process because there are established patterns for adding an exact multiple of the base. In other words, when you add a full group of base units to a number, the ones digit stays the same while only the digit representing the base (like the tens place) increases.

Rearranging to Make Bases (RMB)

Description of Strategy

- **Objective:** Make one of the addends a whole number of bases by moving ones from the other addend.

- **Example:** $8 + 5$

  - Move 2 ones from 5 to 8 to make 10.
  - Remaining ones in the second addend: $5 - 2 = 3$.
  - Add the adjusted numbers: $10 + 3 = 13$.

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--- RMB Execution History (8 + 5) ---
| State          | Action              | Interpretation
|:--------------|:--------------------|:----------------------------------------------------------
| q_calc_K       | Initialize K calc   | Start counting up from A (8) to Target Base (10).
| q_calc_K       | A_temp += 1, K += 1 | Count up: 9. Distance (K): 1.
| q_calc_K       | A_temp += 1, K += 1 | Count up: 10. Distance (K): 2.
| q_calc_K       | Reached Target Base | K needed is 2.
| q_decompose_B  | Initialize B decomp | Start counting down K (2) from B (5).
| q_decompose_B  | B_temp -= 1, K -= 1 | Transferred 1. B remainder: 4. K remaining: 1.
| q_decompose_B  | B_temp -= 1, K -= 1 | Transferred 1. B remainder: 3. K remaining: 0.
| q_decompose_B  | Decomp Complete     | Transferred 2. New state: A=10, B=3.
| q_recombine    | Result = A + B      | Combine rearranged numbers: 10 + 3 = 13.
```