The growth from modelling all quantities and actions in a combining or separating problem to abstract reasoning with numbers is not a smooth or consistent transition for students.

Problem solving reminder: If you are going to use this task remember, answers are important but what is more important is the mathematics students can learn from engaging in the tasks

Task:

Students were asked to solve the following without pen, pencil or calculator:

38 + 29

Amy's group said:

67 because 40 + 27 = 57

What was their strategy?

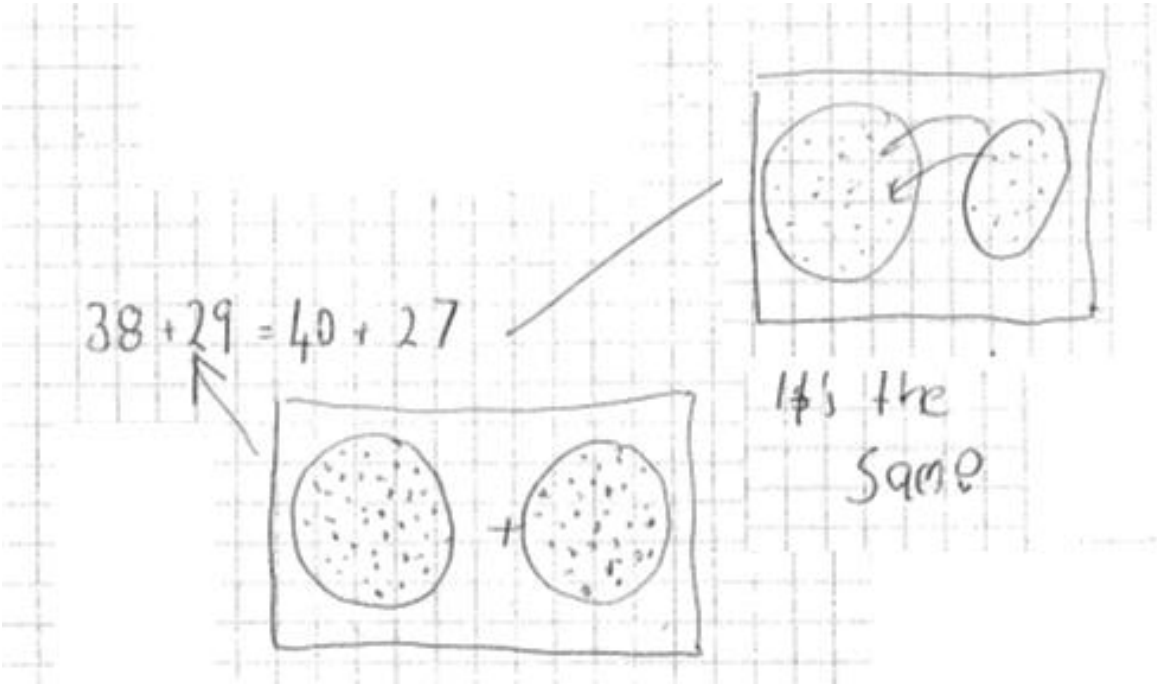
Will this strategy always work?

Justify you answer with representations.

Thoughts for teachers

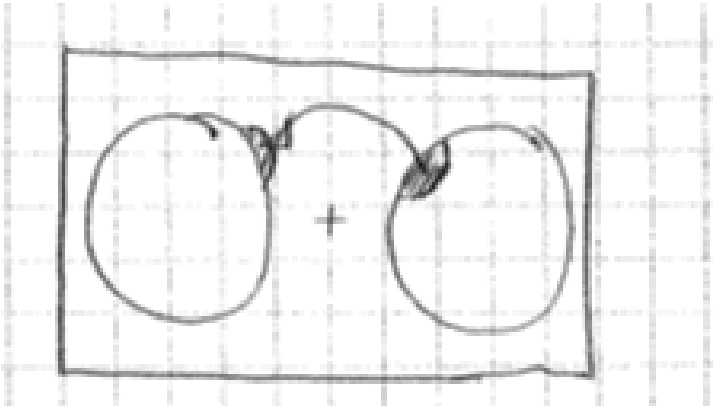
- How would you use this task with your students?
    - What prior experiences should your students have had in order to be able to engage with this task?
    - What misconceptions is this task likely to expose?
    - Would you modify the task in any way for your students?
- What mathematics do you want your students to learn from engaging in this task?
- What questions might you ask as your students as they are working on the task
    - Can you write a mathematical sentence to show Amy's group's strategy?
    - What is Amy's group saying about 38 + 29?
    - Amy's group is saying that 38 + 29 is the same as something else; what is it?
    - Can you write that as a mathematical sentence?
    - Use Amy's strategy to solve this problem…
    - Will Amy's strategy work for all whole numbers? Convince me.

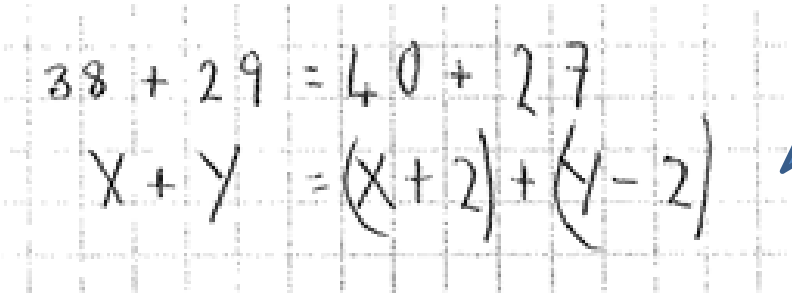
Making sense of the evidence



Teacher: Your picture shows the strategy works for 38+29. Would it work for other numbers too?

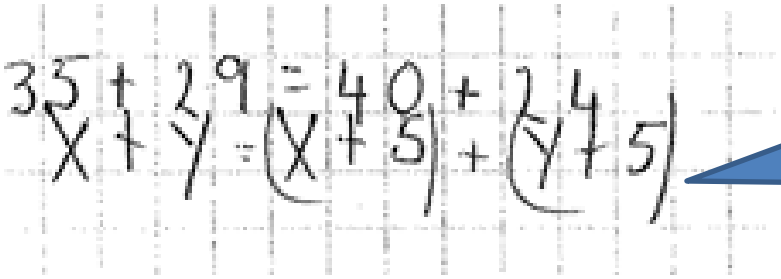
Seosamh: Yes look 'cos it doesn't matter if you are going to put them together if you take 2 from one group and give it to another you'll have the same amount like in the square





What prior knowledge is this student bringing to the task?

Teacher: Would the strategy work for other numbers like say 35+29?



Are your students ready to generalise solution strategies in this way? How would you scaffold your students to generalise their observations?

Extending the learning

Would the strategy work for subtraction? Why? Why not?

Justify your decision

Think: What mathematics do you want your students to learn from extending the task in this way?