Equations in Groups II

Equations in Groups II

Click here to download lesson.

Summary	A student (or a pair of students) begins with a solved equation (e.g. $N = 4$) and pass(es) the equation to neighbor (or pair of neighbors); the neighbor(s) operate(s) equally on each side of the equation. And so on, around the table. There should be at least three students or pair of students at each table. When the series of equations returns to the first students, each student (or pair of students) check whether the solution still holds for the solution they had proposed at the beginning. They also check the logic and correctness of the changes implemented by their classmates.
Goals	1. Students produce equations from a solution (unsolving equations). 2. They substitute a solution into a presumed equivalent equation. 3. They investigate the logic and correctness of the derivations.
Materials	Overheads, Handouts
Keywords	Balancing Equations Full Class Discussion Interpretation of Equations Linear Functions Production of Equations Small Group Work Solving Equations

Activity Plan:

1. Equations with the Same Solutions (whole class: 15 minutes).

   Show and distribute the Handout (Page 1) and ask the children to follow the instructions, modifying the equation but maintaining the equality and the solution to the equation. Explain that they can use addition, subtraction, multiplication, or division. Demonstrate, using the overhead, how they could proceed by implementing changes suggested by the students in the classroom. To avoid difficult computations, you may propose that they work with small numbers, or provide them with calculators, if these are available.

2. Equations with the Same Solutions (group work: 30 minutes).

   Break the class into groups so that, at each table, there will be three children, or three pairs of children, or a combination of these. At each table, each student (or pair of students) begins by proposing a solution to an equation (e.g., $p=10$) and pass(es) the equation to their neighbors; the neighbor (or pair) operates equally on each side of the equation and passes it on to the next pair around the table. After two transformations are implemented, the handouts will return to the students (or pair of students) who had proposed a solution. Each student (or pair of students) will then check whether the solution still holds (or not) and will explain why. They will also check the logic and correctness of the changes implemented by their classmates.

   You may want to limit the kind of operations the students (or some students) will propose by establishing, for instance, that they can use only addition and subtraction, should they be still unsure about multiplication and division.

3. Discussion on children's answers (whole class discussion: 30 minutes).

   Choose a few of the children's productions and answers to discuss in detail.

   Make sure you will discuss proofs based on:

   (a) Substituting the original solution in the variable of the new equation to determine if numerical equality still holds,

   (b) Solving the final equation, and

   (c) Logic: if changes on both sides of the equations were equal, then the same solution to the equation holds.

4. Homework: Equations with the Same Solutions (Page 2).

   Children will work on a similar task, but will operate on the original solution alone at home.

Handout: Equations with the Same Solutions

(Page 1)

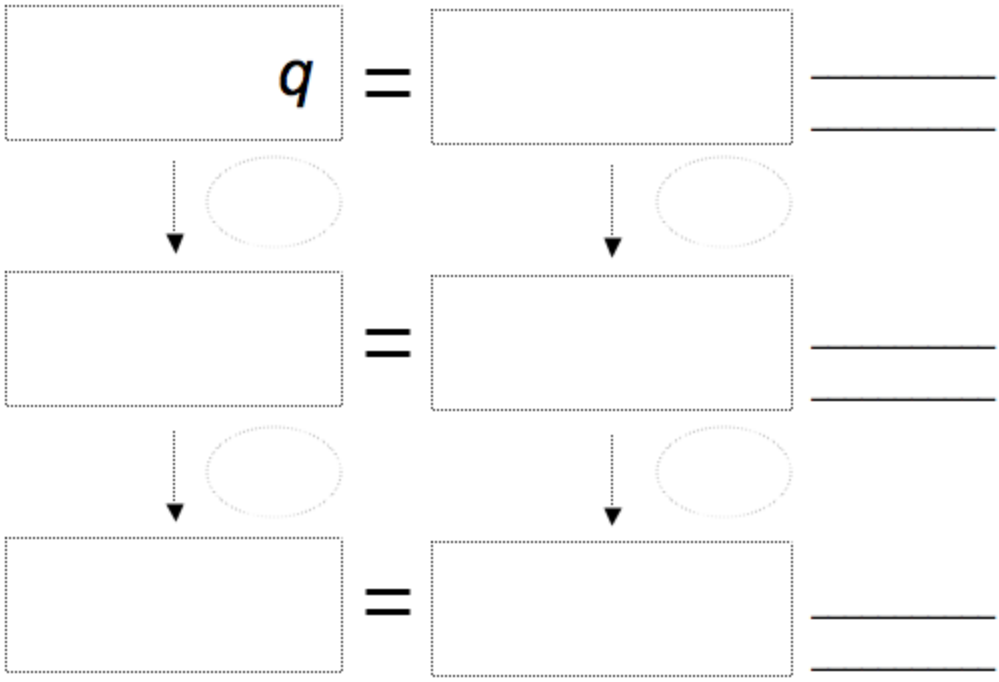
Name: _____ Date: _____

Write your name(s) here.

<u>Equation 1:</u>
Begin by filling in a value for q.

<u>Equation 2:</u>
Propose a change and write another true equation based on equation 1

<u>Equation 3:</u>
Propose a change and write another true equation based on equation 2



Does equation 3 have the same solution as equation 1? Yes or No?

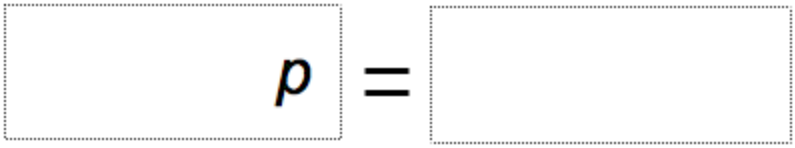
Prove that equation 3 has (or does not have) the same solution as equation 1:

Homework: Equations with the Same Solutions

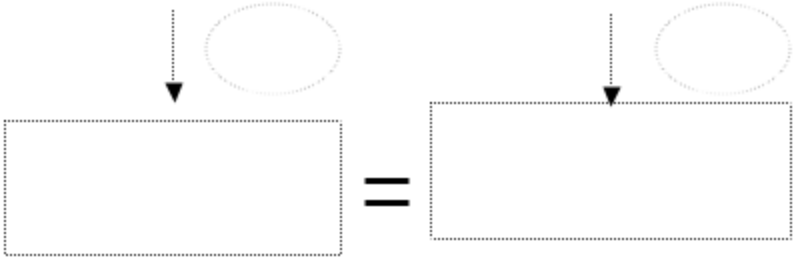
(Page 2)

Name: _____ Date: _____

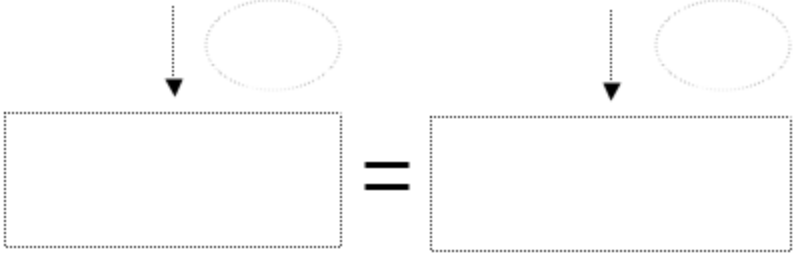
Equation 1:
Begin by filling in a value for p.



Equation 2:
Propose a change and write another true equation based on equation 1



Equation 3:
Propose a change and write another true equation based on equation 2



Does equation 3 have the same solution as equation 1? Yes or No?

Prove that equation 3 has (or does not have) the same solution as equation 1: