

Solving Equations I

Solving Equations I

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Summary	Students will be asked to use the syntactic rules of algebra to solve equations with variables on both sides of the equals sign.
Goals	<ol style="list-style-type: none">1. To develop proficiency in solving equations.2. To work on the concept of "solution(s) of an equation".
Materials	Overheads, Handouts
Keywords	Balancing Equations Full Class Discussion Interpretation of Equations Linear Functions Small Group Work Solving Equations

Activity Plan:

1. Solving an equation (whole class work: 20 minutes).

Show the first overhead (Page 1) and distribute the first handout (same Page 1).

Here are some things to keep in mind, when discussing Handout 1, before students receive it:

- N can vary, that is, take on "any value" (in the domain), but equations are not usually **true** for any value of N . Those for which they are true are the solutions, or the roots.
- The **set of solutions** may be empty; it may have one solution; it may have many, even an infinite number of solutions. We generally work with cases where there is only one solution.
- "**Solving for N** " means finding what values (if any) of N make the equality true.
- The students' job is generally to find an equation of the form, $N = \text{<some number>}$. They do this by deriving simpler equations, each of which has the same solution (set) as the first. But remember, there may be no solution (or an infinite number of solutions).

Building upon children's suggestions, go through all the steps to solve the equation in Page 1. As a solution is developed and discussed, children will take notes on their handouts. They will keep their written work for consultation as they will solve the next equation.

Here are some questions to keep in mind, after the equation is solved:

- Are there values of N that make equation 1 true? Does Equation 1 have any solution(s)?
- Are there values of N that make equation 2 true? Does Equation 2 have a solution(s)?

2. Solving another equation (group work: 30 minutes).

Distribute the second handout (Page 2) and ask the children to solve the equation. After they finish working on this equation, give them the third Handout (Page 3), with additional equations to be solved, and copies of the worksheet (Page 5) for working on each equation.

3. Discussing children's solutions (whole class discussion: 30 minutes).

Ask children to show and discuss their solution strategies for some of the equations they have solved.

4. Homework: Equations (Page 4 & 5)

Children will work on solving similar equations. (The worksheet on Page 5 is optional but, if used, many copies may be necessary.)

Overhead and Handout: Solving an Equation (Page 1)

Name: _____ Date: _____

Solve the following equation for N :

	$3N + 40$	=	$N + 60$
Subtract something from both sides of the equation	↓ ○		↓ ○
		=	
Can you subtract something else?	↓ ○		↓ ○
		=	
What can you do now to solve the equation?	↓ ○		↓ ○
		=	

What is the solution to the equation you started with? _____

What value(s) of n makes the third equation true? _____

Explain:

Overhead and Handout: Solving another Equation

(Page 2)

Name: _____ Date: _____

Solve the following equation:

$5K - 30$	=	$3K - 10$
↓ 		↓
	=	
↓ 		↓
	=	
↓ 		↓
	=	

What is the solution to the first equation? _____

And the solution to the third equation? _____

Explain:

Handout: Solving other Equations**(Page 3)**

Name: _____ Date: _____

Solve some of the following equations. Use a worksheet (separate paper) for each equation.

Solve for n : $5n + 30 = 80$

Answer: $n =$ _____

Solve for n : $7n - 2 = 75$

Answer: $n =$ _____

Solve for p : $6p + 11 = 5p + 49$

Answer: $p =$ _____

Solve for p : $p \div 13 = 4$

Answer: $p =$ _____

Solve for r : $r \times 7 + 1 = 50$

Answer: $r =$ _____

Solve for x : $5x = 3x$

Answer: $x =$ _____

Solve for n : $6n - 4n = n + 18$

Answer: $n =$ _____

Solve for n : $39n + 1017 = 39 + 1017$

Answer: $n =$ _____

Solve for n : $8n + y + 20 = 4n + y + 60$

Answer: $n =$ _____

Solve for p : $\frac{8p}{2p} - 10 = 30$

Answer: $p =$ _____

Homework: Solving Equations (Page 4)

Name: _____ Date: _____

Use worksheets to solve each of the following equations:

Solve for n : $5n + 20 = 70$

Answer: $n =$ _____

Solve for n : $7n - 2 = 75$

Answer: $n =$ _____

Solve for n : $5(n + 1) = 50$

Answer: $n =$ _____

Solve for n : $10n - 2n = 40$

Answer: $n =$ _____

Solve for n : $8n + y + 30 = 4n + y + 62$

Answer: $n =$ _____

Solve for p : $5p \div 3 = 10$

Answer: $p =$ _____

Solve for r : $r \times (7 + 1) = 24$

Answer: $r =$ _____

Solve for p : $\frac{8p}{2p} - 7 = 32$

Answer: $p =$ _____

Worksheet: Solving Equations

(Page 5)

Name: _____ Date: _____

The worksheet contains five rows of empty boxes and ovals. Each row consists of a dashed rectangular box on the left, followed by an equals sign (=), and another dashed rectangular box on the right. Below each of these boxes is a dashed oval. Curved arrows on the left side of each row point from the oval up to the box. Curved arrows on the right side of each row point from the box down to the oval. This layout is designed for students to write equations and solve them step-by-step.