



MATH WITH MR DJ

GRADE 6 · EXPRESSIONS & EQUATIONS

CHECKING SOLUTIONS BY SUBSTITUTION

Today's goal: I can use substitution to determine whether a number or a set of numbers makes an equation true, use substitution to determine whether a number or a set of numbers makes a one-variable, one-step equation true, use substitution to determine whether a number or a set of numbers makes a one-variable, one-step inequality true, use substitution to determine whether a number or a set of numbers makes an inequality true and demonstrate that the solution of an equation or inequality is the value of the variable that will make the equation or inequality true.



Is $x = 5$ a solution of $x + 7 = 12$?

1 How would you check?

TURN & TALK

solve it again, or put 5 in?



A solution makes the statement **TRUE**

- 1 Substitute the value into the ORIGINAL statement.
- 2 If both sides match, it is a solution. If not, it is not.



BIG IDEA 2

$$5 + 7 = 12 \rightarrow 12 = 12 \quad \checkmark$$

- 1 Substituting tests your answer against the problem.
- 2 Re-solving just repeats whatever you did the first time — including any mistake.

REMEMBER

A real check has to be independent.



BIG IDEA 3

Inequalities have **MANY** solutions

1 $x > 4$ is true for 5, 10, 4.5, 1000...

2 $x - 3 = 10$ is true for exactly one number: 13.

REMEMBER

An equation pins a point. An inequality names a range.



BIG IDEA 4

Watch the symbol

1 $x > 4 \rightarrow 4$ is NOT a solution (not greater than itself)

2 $x \geq 4 \rightarrow 4$ IS a solution

REMEMBER

The line under the symbol includes the boundary.



SPOT THE SLIP!

Turn & talk

Something went wrong here...

THE PROBLEM

Is $m = 14$ a solution of $m - 5 = 9$?

WHAT A STUDENT DID

Subtracted in the wrong order.

YOUR MISSION

What went wrong? What's the right answer?



Is $m = 14$ a solution of $m - 5 = 9$?

1 $14 - 5 = 9 \rightarrow \text{true.}$

Answer: **Yes**



Pick your pepper!



MILD

Is $n = 7$ a solution of $n + 8 = 15$?

#1 on your practice sheet



MEDIUM

Is $x = 18$ a solution of $x \div 3 = 6$?

#3 on your practice sheet



SPICY

For $x \geq 6$, is 6 a solution?
Is 5? Explain how $\geq$ differs from $>$.

#6 on your practice sheet

How's it going?



3 • Got it!

I could teach it



2 • Almost

One more example, please



1 • Not yet

I need some help



NOW YOU!

Practice sheet: everyone does Mild & Medium, then climb the peppers.

Stuck? Look back at Mr DJ's example at the top of the sheet.

Need it again? Watch “Variables, Expressions, and Equations Explained | Algebra for Beginners” on YouTube @MathWithMrDJ

Brain break: 3 new daily puzzles at puzzles.mathwithmrdj.com

