



MATH WITH MR DJ

GRADE 8 · EXPRESSIONS & EQUATIONS

SOLVING LINEAR EQUATIONS

Today's goal: I can solve linear equations in one variable, including cases with one solution, infinitely many solutions, or no solutions and solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.



Tan



Digit



Blaze



Pi



The usual case

1 $3x + 4 = 19 \rightarrow 3x = 15 \rightarrow x = 5.$

2 Check: $3(5) + 4 = 19. \checkmark$

TURN & TALK

Always substitute back. It costs ten seconds.



Distribute to EVERY term

1 $3(x + 2) = 3x + 6.$

2 NOT $3x + 2.$

REMEMBER

Test at $x = 4$: 18 against 14. The dropped 6 is visible.



BIG IDEA 2

x on both sides

1 $2x + 7 = 5x - 8$

2 $15 = 3x$, so $x = 5$.



BIG IDEA 3

When the x disappears

1 $2x + 3 = 2x + 5$

2 Subtract $2x$: $3 = 5$.

REMEMBER

$3 = 5$ is false. So NO number works.



BIG IDEA 4

'No solution' is the answer

- 1 Not $x = 0$. Not a blank.
- 2 Try $x = 0$: 3 against 5. Try $x = 100$: 203 against 205.

REMEMBER

Never equal, whatever you put in.



BIG IDEA 5

Or every number works

1 $4(x + 1) = 4x + 4$

2 Expand: $4x + 4 = 4x + 4$.

REMEMBER

Both sides are the SAME expression. Infinitely many solutions.



SPOT THE SLIP!

Turn & talk

Something went wrong here...

THE PROBLEM

Expand $6(x + 5)$ and $6(x - 5)$.

WHAT A STUDENT DID

Answered $6x + 5$ and $6x - 5$.

YOUR MISSION

What went wrong? What's the right answer?



Expand $6(x + 5)$ and $6(x - 5)$.

- 1 The 6 reaches both terms.
- 2 The sign inside travels with the term.

Answer: $6x + 30$ and $6x - 30$



YOUR TURN

Whiteboards up!

Pick your pepper!



🌶️ MILD

Solve $4x - 7 = 17$.

#1 on your practice sheet



🌶️🌶️ MEDIUM

Solve $3(x + 4) = 27$.

#2 on your practice sheet



🌶️🌶️🌶️ SPICY

Solve $5x + 2 = 5x + 11$.

#5 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



MATH WITH MR DJ

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 "Solving Two Step Algebraic Equations: Step By Step Guide" on YouTube @MathWithMrDJ

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

