

Pre-Algebra

Skill Builder # LE - 6

Solving Linear Equations Involving Symbols of Grouping

Two skill builders ago our method for solving $ax+b=cx+d$ was:

- 1) Put the terms involving the variables on one side.
- 2) Put the terms involving the constants on the other side.
- 3) Use the Multiplication/Division Property to solve the equation.

One skill builder ago we learned that we must first combine like terms before doing the above steps.

In this skill builder we deal with grouping symbols. Before doing the above steps we use the distributive property to remove grouping symbols. It is usually best to start removing the innermost symbols of grouping first.

- 1) $9y + 3(9 - y) = 6y - 10(y + 5)$ We wish to solve this equation.
 $9y + 27 - 3y = 6y - 10y - 50$ We have removed grouping symbols.
 $6y + 27 = -4y - 50$ We have combined like terms.
 $6y + 4y = -50 - 27$ Variables on the LHS and constants on the RHS.
 $10y = -77$ Simplify.
 $y = \frac{-77}{10}$ Here we have the answer.
- 2) $5 - (-y + 6) = 2(-y + 3) - 7(y + 1)$ We wish to solve this equation.
 $5 + y - 6 = -2y + 6 - 7y - 7$ We have removed grouping symbols.
 $y - 1 = -9y - 1$ We have combined like terms.
 $y + 9y = -1 + 1$ Variables on the LHS and constants on the RHS.
 $10y = 0$ Simplify.
 $y = \frac{0}{10}$ We multiply both sides by the recip. of 10.
 $y = 0$ Here we have the answer.
- 3) $-2(x - 5) + 10 = -3(x + 2) + x$ We wish to solve this equation.
 $-2x + 10 + 10 = -3x - 6 + x$ We have removed grouping symbols.
 $-2x + 20 = -2x - 6$ We have combined like terms.
 $-2x + 2x = -6 - 20$ Variables on the LHS and constants on the RHS.
 $0 = -26$ This is a contradiction so there is no solution.
No Solution

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Solve the following equations.

1) $2(x-1) + 3(x+2) = 4(x-1) + 9$ 2) $2 - (y-3) - (y+3) = 20 - 4(y+3)$

3) $2 - 3(1-3x) = 2(4x-1) + x + 1$ 4) $5(2-n) - 2(n-5) = 2 - 5(2-n)$

5) $8k + 36 - 8(k-5) = 40 + k - 5(1-8k)$ 6) $-7k + 9 - 7(9-k) = 9 - 7(k-9) - 7$

7) $9 - 6(n-1) - (2n+5) = 4 - 2(n+3)$ 8) $-\frac{2}{3}(3x-9) + \frac{3}{4}(16-8x) = \frac{5}{6}(18-6x)$
(a little more difficult)

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Answer Key:

1) $x = 0$

2) $y = 3$

3) All Real Numbers.

4) $n = \frac{7}{3}$

5) $k = 1$

6) $k = 17$

7) $n = 2$

8) $x = 1$