Algebra I

3-5

Solving Equations

Solve - Get the variable on a side by itself.

We need to put all the *n*s together, so we move the 2*n* because there is less clutter on the 5*n* side.

There are benefits to taking care of the variables before the number terms, so do that first. If each side is equally cluttered, move the 4*n* so we work with positive numbers.

1) $5n = 2n + 6$

$5n - 2n = 2n - 2n + 6$

$\frac{3n}{3} = \frac{6}{3}$

$n = 2$

$\{2\}$

13) $4n + 5 = 6n + 7$

$4n - 4n + 5 = 6n - 4n + 7$

$5 = 2n + 7$

$5 - 7 = 2n + 7 - 7$

$\frac{-2}{2} = \frac{2n}{2}$

$-1 = n$

$\{-1\}$

19) $2(x - 6) = 3x$

$2x - 12 = 3x$

$2x - 2x - 12 = 3x - 2x$

$-12 = x$

$\{-12\}$

We have to do the distributive property first with this one, or work with fractions...

We can ignore the parentheses due to the associative property.

*) $(8x + 3) - 7 = 4(2x + 1)$

associative

$8x + 3 - 7 = 8x + 4$ ← Given the choice, do letters First

$8x - 4 = 8x + 4$

$8x - 8x - 4 = 8x - 8x + 4$

$-4 = 4$ ← What? The variables disappeared!

Is this true? No!

No solution symbol → $\varnothing$

If all the variables disappear, the answer will be all reals or no solution. To decide, look at what is left. If it is true: all reals; If it is false: no solution.

*) $3(2x - 5) = 6(x - 2) - 3$

$6x - 15 = 6x - 12 - 3$

$6x - 15 = 6x - 15$ → as soon as both sides are the same, $\mathbb{R}$

$6x - 6x - 15 = 6x - 6x - 15$

$-15 = -15$ ← The variables disappear!

Is this true

Yes!

all Real numbers → $\mathbb{R}$

If all the variables disappear, the answer will be all reals or no solution. To decide, look at what is left. If it is true: all reals; If it is false: no solution.

The textbook calls an All Reals problem an identity.

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