Steps in Solving Equations

Let's recall steps in solving equations.

5.1 Explaining Equivalent Expressions

Explain or show why each of these equations is equivalent to $7(x - 15) + 3 = 8$.

1. $7x - 105 + 3 = 8$

2. $7(x - 15) - 5 = 0$

3. $7x - 102 - 8 = 0$

Here is Clare's work to solve some equations. For each problem, do you agree or disagree with Clare's work? Explain your reasoning.

1.
$$2(x - 1) + 4 = 3x - 2$$
$$2x - 2 + 4 = 3x - 2$$
$$2x + 2 = 3x - 2$$
$$2x = 3x$$
$$-x = 0$$
$$x = 0$$

2.
$$3(x - 1) = 5x + 6$$
$$3x - 1 = 5x + 6$$
$$-1 = 2x + 6$$
$$-7 = 2x$$
$$-3.5 = x$$

3.
$$(x - 2)(x + 3) = x + 10$$
$$x^2 + x - 6 = x + 10$$
$$x^2 - 6 = 10$$
$$x^2 = 16$$
$$x = 4$$

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5.3   Row Game: Rewriting Equations

Work independently on your column. Partner A completes the questions in column A only, and partner B completes the questions in column B only. Your answers in each row should match. Work on one row at a time, and check if your answer matches your partner's before moving on. If you don't get the same answer, work together to find any mistakes.

Partner A: Write an equivalent equation so that the given condition is true.

Partner B: Write an equivalent equation so that the given condition is true.

1. $5x + 10 = \text{-}35$

   ◦ The expression on the right side is 0.

   $5(x + 9) = 0$

   ◦ The left side is expressed as the sum of two terms.

2. $x^2 - 9x = 42$

   ◦ The left side is a product.

   $x(x - 9) - 42 = 0$

   ◦ The left side is a product, and the right side is not 0.

3. $x(x + 3) + 9 = 1$

   ◦ The right side is 0.

   $x(x + 3) + 6 = \text{-}2$

   ◦ The right side is 0.

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4. $8(x + 1) = 5x$ $\qquad$ $3x = -8$

  ◦ The left side is 0, and there are no   ◦ The left side is 0.
parentheses.

5. $11 + x = \frac{12}{x}$ $\qquad$ $(x + 12)(x - 1) = 0$

  ◦ The equation is quadratic, and the right   ◦ The left side involves x^2.
side is 0.

6. $(3x - 5)(x - 2) = 0$ $\qquad$ $3x - 11 = \frac{10}{x}$

  ◦ One side of the equation has a term   ◦ One side of the equation has a term with
with $3x^2$. $3x^2$.

7. $4x^2 - 4 = 8$ $\qquad$ $4(x^2 - 1) = 8$

  ◦ The right side is 0, and the left side is a   ◦ The right side is 0, and the left side is a
product.   product.

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