Unit 7 Lesson 5: Steps in Solving Equations

1 Explaining Equivalent Expressions (Warm up)

Student Task Statement

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. $7x - 102 - 8 = 0$

2 Checking Work

Student Task Statement

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

3 Row Game: Rewriting Equations

Student Task Statement

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.

1. $5x + 10 = -35$
    - The expression on the right side is 0
2. $x^2 - 9x = 42$
    - The left side is a product
3. $x(x + 3) + 9 = 1$
    - The right side is 0
4. $8(x + 1) = 5x$
    - The left side is 0 and there are no parentheses
5. $11 + x = \frac{12}{x}$
    - The equation is quadratic and the right side is zero.
6. $(3x - 5)(x - 2) = 0$
    - One side of the equation has a term with $3x^2$
7. $4x^2 - 4 = 8$
    - The right side is 0 and the left side is a product

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

1. $5(x + 9) = 0$
    - The left side is expressed as the sum of two terms
2. $x(x - 9) - 42 = 0$
    - The left side is a product and the right side is not 0
3. $x(x + 3) + 6 = -2$
    - The right side is 0
4. $3x = -8$
    - The left side is 0
5. $(x + 12)(x - 1) = 0$
    - The left side involves x^2
6. $3x - 11 = \frac{10}{x}$
    - One side of the equation has a term with $3x^2$
7. $4(x^2 - 1) = 8$
    - The right side of is 0 and the left side is a product