Unit 4 Lesson 16: How Many Solutions?

1 Matching Solutions (Warm up)

Student Task Statement

Consider the unfinished equation $12(x-3)+18 =$ _____. Match the following expressions with the number of solutions the equation would have with that expression on the right hand side.

1. $6(2x-3)$
2. $4(3x-3)$
3. $4(2x-3)$

- one solution
- no solutions
- all solutions

2 Thinking About Solutions Some More

Student Task Statement

Your teacher will give you some cards.

1. With your partner, solve each equation.
2. Then, sort them into categories.
3. Describe the defining characteristics of those categories and be prepared to share your reasoning with the class.

3 Make Use of Structure (Optional)

Student Task Statement

For each equation, determine whether it has no solutions, exactly one solution, or is true for all values of x (and has infinitely many solutions). If an equation has one solution, solve to find the value of x that makes the statement true.

1. a. $6x + 8 = 7x + 13$

   b. $6x + 8 = 2(3x + 4)$

   c. $6x + 8 = 6x + 13$

2. a. $\frac{1}{4}(12 - 4x) = 3 - x$

   b. $x - 3 = 3 - x$

   c. $x - 3 = 3 + x$

3. a. $-5x - 3x + 2 = -8x + 2$

   b. $-5x - 3x - 4 = -8x + 2$

   c. $-5x - 4x - 2 = -8x + 2$

4. a. $4(2x - 2) + 2 = 4(x - 2)$

   b. $4x + 2(2x - 3) = 8(x - 1)$

   c. $4x + 2(2x - 3) = 4(2x - 2) + 2$

5. a. $x - 3(2 - 3x) = 2(5x + 3)$

   b. $x - 3(2 + 3x) = 2(5x - 3)$

   c. $x - 3(2 - 3x) = 2(5x - 3)$

6. What do you notice about equations with one solution? How is this different from equations with no solutions and equations that are true for every x?