

9.7 One, Infinite, or No Solutions

Common Core Standards

8. EE.7. Solve linear equations in one variable.

a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).

b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

WARM-UP

Solve the equations.

1) $9x = 2x - 84$

2) $-x - 5x - 14 = 3x - 59$

One, Infinite, or No Solutions

Does every equation have one solution?

$$3x - 8 = 3x - 8$$

NOTES

When x is on both sides, the equation may have **no solution**, or an infinite amount of solutions. Trying to solve an equation with no solution produces an equation that isn't true.

Examples

Solve the equations.

$$4x + 18 = 4x + 5$$

$$-5x - x + 7 = -6x + 2$$

NOTES

Trying to solve an equation with **infinite solutions** produces an equation that is true for all values of x . This is called an **identity**.

Examples

Solve the equations.

$$5x + 8 = 5x + 8$$

$$3x - 14 - 2 = 8x - 5x - 16$$

EXAMPLES

Solve the equations. State if the equation has one, no, or infinite solutions.

$$-5x - 13 = x + 29$$

$$-2x + 15 + x = -x + 7 + 9$$

NOTES

A solution of $x = 0$, is still one solution.

Examples

Solve the equations. State if the equation has one, no, or infinite solutions.

$$5x - 13 = x - 13$$

NOTES

If an equation has parentheses we usually do distributive property first.

Examples

Solve the equations. State if the equation has one, no, or infinite solutions.

$$5(x - 2) = 3x + 18$$

$$2(x - 6) + x = 3x - 12$$

PRACTICE

Solve the equations. State if the equation has one, no, or infinite solutions.

$$7x + 9 - 2x = 5x - 6 + 15$$

$$2(-5x + 7) = -10x + 12$$

FINAL QUESTION

Solve the equation. State if the equation has one, no, or infinite solutions.

$$-9x + 30 = 2(x - 1) + 32$$