Number of Solutions to Linear Equations Worksheet

Grade 8 · Common Core 8.EE.C.7a

> 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).

Practice

Builds the skill step by step.

1. Solve, or write no solution or infinitely many solutions: $3x + 2 = 3x + 5$

2. Solve, or write no solution or infinitely many solutions: $2(x + 3) = 2x + 6$

3. Solve, or write no solution or infinitely many solutions: $4x - 1 = 2x + 7$

4. An equation simplifies to 5 = 5. How many solutions does it have?

   A. One
   B. None
   C. Infinitely many
   D. Two

5. An equation simplifies to 0 = 7. How many solutions does it have?

   A. One
   B. None
   C. Infinitely many
   D. Two

6. Solve, or write no solution or infinitely many solutions: $5x = 5x$

7. Solve, or write no solution or infinitely many solutions: $x + 9 = x - 1$

8. Solve, or write no solution or infinitely many solutions: $6x + 1 = 4x + 11$

9. Which equation has no solution?

   A. $2x + 1 = 2x + 4$

   B. $2x + 1 = x + 4$

   C. $2x + 1 = 2(x + 1) - 1$

   D. $x = 4$

10. An equation simplifies to $x = 3$. How many solutions does it have?

    A. One

    B. None

    C. Infinitely many

    D. Two

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On Level

Grade-level practice.

1. Solve, or write no solution or infinitely many solutions: $3(x - 2) = 3x - 6$

2. Solve, or write no solution or infinitely many solutions: $5x + 4 - 2x = 3x + 1$

3. Solve, or write no solution or infinitely many solutions: $2(x + 5) = 4x - 2$

4. Solve, or write no solution or infinitely many solutions: $7 - (x + 2) = -x + 5$

5. Solve, or write no solution or infinitely many solutions: $4(x + 1) = 2(2x + 3)$

6. Which value of k gives $3x + k = 3x + 8$ infinitely many solutions?

   A. 0

   B. 3

   C. 8

   D. No value of k

7. Solve, or write no solution or infinitely many solutions: $0.5(4x - 6) = 2x - 3$

8. Solve, or write no solution or infinitely many solutions: $6x - 2(x + 1) = 3x + 5$

9. Mia simplifies an equation to $2x = 2x + 3$, then to $0 = 3$. She says the answer is $x = 0$. Which is correct?

   A. The equation has infinitely many solutions.

   B. The equation has no solution.

   C. $x = 3$

   D. $x = 0$ is correct.

10. Solve, or write no solution or infinitely many solutions: $-3(x - 4) = -3x + 12$

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Challenge

Multi-step and word problems that stretch it.

1. Find k so that $5x + 2 = kx + 2$ has infinitely many solutions.

2. Find k so that $4(x - 1) = kx + 3$ has no solution.

3. Find c so that $2(3x + c) = 6x + 10$ has infinitely many solutions.

4. Solve, or write no solution or infinitely many solutions: $3(2x - 1) + 4 = 6x + 1$

5. Solve, or write no solution or infinitely many solutions: $\frac{1}{2}(8x + 6) = 4x - 3$

6. Solve, or write no solution or infinitely many solutions: $5(x - 2) - 3x = 2(x - 5)$

7. Solve, or write no solution or infinitely many solutions: $9 - 2(x + 3) = 4x - 3$

8. Which statement about $ax + 7 = 3x + 7$ is true?

   A. If $a = 3$, there is no solution.

   B. It never has a solution.

   C. If $a \neq 3$, the only solution is $x = 0$.

   D. If $a \neq 3$, there are infinitely many solutions.

9. Plan A costs 10 dollars plus 5 dollars per gigabyte. Plan B costs 12 dollars plus 5 dollars per gigabyte. For how many gigabytes g are the costs equal? Solve $5g + 10 = 5g + 12$, or write no solution or infinitely many solutions.

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10. An equation simplifies to $4x + 7 = 4x + 7$. Which describes its solutions?

    A. Only $x = 7$ is a solution.

    B. Only $x = 0$ is a solution.

    C. No value of x is a solution.

    D. Every value of x is a solution.