

Lesson 2-4: Equations with No Solutions or Infinitely Many Solutions

1. No; Sample answer: A one-variable equation can have one solution, no solution, or infinitely many solutions.
2. Yes; Sample answer: As soon as you simplify the right side of the equation to $6x + 12$, you see that both sides of the equation are the same. This means that the statement is always true, and there are infinitely many solutions.
3. No; Sample answer: The equation can be simplified as $12x + 6 = 12x + 12$. Since $6 \neq 12$, the equation is a false statement, so there is no solution to this equation.
4. None; Sample answer: Since $12 \neq 7$, there is no solution,
5. Infinitely many; Sample answer: Since $-8 = -8$ is always true, there are infinitely many solutions.
6. When they both purchase 8 pieces of fruit; Sample answer: Todd pays $1.25x + 4$. Agnes pays $x + 6$. $1.25x + 4 = x + 6$ is the equation that represents the same amount for their purchases. Subtract x from both sides, $0.25x + 4 = 6$. Subtract 4 from both sides, $0.25x = 2$. Divide both sides by 0.25, $x = 8$. Since x represents a number value, 8, the equation has one solution.
7. $33x$; $33x$
 \neq
Never; no
8. $4x$; 3
 $16x$; 12
 $16x$; $16x$
 $=$
Always; infinitely many
9. Sample answer: The equation has infinitely many solutions because 0 is always equal to 0.
10. Infinitely many solutions; Sample answer: Applying the Distributive Property shows that the equivalent equation is true for all values of x .
11. Never; Sample answer: If you set the expressions as equal, you can use the Distributive Property to get $15x - 2 = 15x + 21$. Since $-2 \neq 21$, this equation has no solution.
12. Sample answer: When you try to solve for the variable, the variable can be eliminated from both sides of the equations.
13. One solution; $x = 1$
14. No solution since $-6 \neq 28$; Sample answer: Your friend thought $16x - 16x$ was x instead of 0.
15. a. No solution
b. Sample answer: $3x + 2 = 3x + 5$;
 $x + 7 = x - 7$
16. One solution
17. Answers may vary.
18. One solution

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19. Sample answer:

One solution: $x + 2 = 3x + 7$

No solution: $x + 7 = x + 12$

Infinitely many solutions: $4x + 2 = 2(2x + 1)$

20. $-7 = -7$; infinitely many solutions

21. $-10 \neq 80$; no solution

22. Infinitely many solutions

23. One solution

24. B

25. A, E