

OBJECTIVE 1: Applying a General Strategy for Solving a Linear Equation**STEPS:**

- 1) Multiply both sides by the LCD to get rid of fractions, if necessary.
- 2) Distribute to remove parentheses, if necessary.
- 3) Simplify each side of the equation to CLT.
- 4) Get all terms on one side and constant numbers to the other side using Addition POE.
- 5) Get the variable alone using Multiplication POE.
- 6) Check the solution by substituting into the original equation.

Task 1: Solve & Check. Show all work.

a) $4(2x - 3) + 7 = 3x + 5$

$$8x - 12 + 7 = 3x + 5$$

$$8x - 5 = 3x + 5$$

$$5x = 10$$

$$x = 2$$

c) $8(2 - n) = -5n$

$$16 - 8n = -5n$$

$$\frac{16}{3} = \frac{3n}{3}$$

$$\frac{16}{3} = n$$

b) $2(4a - 9) + 3 = 5a - 6$

$$8a - 18 + 3 = 5a - 6$$

$$8a - 15 = 5a - 6$$

$$3a = 9$$

$$a = 3$$

d) $7(y - 3) = -6y$

$$7y - 21 = -6y$$

$$13y - 21 = -21$$

$$\frac{21}{13} = y$$

OBJECTIVE 2: Solving Equations Containing Fractions

Task 2: Solve & Check. Show your work.

a) $\left(\frac{x}{2} - 1 = \frac{2}{3}x - 3\right)^6$

$$3x - 6 = 4x - 18$$

$$-3x + 18 = -3x + 18$$

$$18 = 18$$

$$\frac{12}{2} - 1 = 6 - 1 = 5 \checkmark$$

$$\frac{2}{3}(12) - 3 = \frac{24}{3} - 3 = 8 - 3 = 5 \checkmark$$

$$8 - 3 = 5 \checkmark$$

Task 3: Solve & Check. Show all work.

a) $\left[\frac{2(a+3)}{3} = 6a + 2\right] 3$

$$2a + 6 = 18a + 6$$

$$-2a - 6 = -2a - 6$$

$$\frac{0}{16} = \frac{16a}{16}$$

$$0 = a$$

$$\frac{2(0+3)}{3} = \frac{2(3)}{3} = 2 \checkmark$$

$$6(0) + 2 = 2 \checkmark$$

b) $\left[\frac{4(d+3)}{3} = 5d - 7\right] 3$

$$4d + 12 = 15d - 21$$

$$-4d + 21 = -4d + 21$$

$$\frac{33}{11} = \frac{11d}{11}$$

$$3 = d$$

$$\frac{4(3+3)}{3} = \frac{4(6)}{3} = \frac{24}{3} = 8 \checkmark$$

$$5(3) - 7 = 15 - 7 = 8 \checkmark$$

OBJECTIVE 3: Solving Equations Containing Decimals

Task 4: Solve & Check. Show your work.

a) $0.25x + 0.10(x - 3) = 0.05(22)$ 100

$25x + 10(x - 3) = 5(22)$

$25x + 10x - 30 = 110$

$35x - 30 = 110$
 $+30 +30$

$\frac{35x = 140}{35} \quad x \approx 3.143$

b) $0.35x + 0.09(x + 4) = 0.03(12)$ 100

$35x + 9(x + 4) = 3(12)$

$35x + 9x + 36 = 36$
 $44x = 0 \quad x = 0$

Task 5: Solve and show your work.

a) $-2(x - 5) + 10 = -3(x + 2) + x$

$-2x + 10 + 10 = -3x - 6 + x$
 $-2x + 20 = -2x - 6$
 $20 \neq -6$

b) $5(2 - x) + 8x = 3(x - 6)$

$10 - 5x + 8x = 3x - 18$
 $10 + 3x = 3x - 18$
 $10 \neq -18$

c) $-6(2x + 1) - 14 = -10(x + 2) - 2x$

$-12x - 6 - 14 = -10x - 20 - 2x$
 $-12x - 20 = -12x - 20$

d) $12x - 18 = 9(x - 2) + 3x$

$12x - 18 = 9x - 18 + 3x$
 $12x - 18 = 12x - 18$

\emptyset or $\{ \}$

$\emptyset; \{ \}$

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∞ or \mathbb{R}

Still need help with:

OBJECTIVE 4: Recognizing Identities & Equations with No Solution

Solution

So far each equation has had one solution, BUT not every equation works that way.

$x + 5 = x + 7$ NEVER TRUE = no solution or \emptyset

$x + 6 = x + 6$ ALWAYS TRUE = infinitely many solutions or all real numbers

The second example above is an example of an identity. The first example is untrue, and no value for the variable will make the equation true, so we call it no solution. In notation: $\{ \}$ empty set or \emptyset null set are other ways of saying no solution.

Task 6: Using Your Calculator

Type the left side of the = in and then the right side. The values should be the same if the solution is possible.

a) $2x = 48 + 6x; x = -12$ $2(-12) = -24$ ✓ $48 + 6(-12) = -24$ ✓

b) $-3x - 7 = 3x - 1; x = -1$ $-3(-1) - 7 = -4$ ✓ $3(-1) - 1 = -4$ ✓

c) $5x - 2.6 = 2(x + 0.8); x = 4.4$ $5(4.4) - 2.6 = 19.4$ ✓ $2(x + 0.8) = 19.4$ ✓

d) $-1.6x - 3.9 = -6.9x - 25.6; x = 5$ $-1.6(5) - 3.9 = -11.9$ ✓ $-6.9(5) - 25.6 = -11.9$ ✓

e) $\frac{564x}{4} = 200x - 11(649); x = 121$ $\frac{564(121)}{4} = 17,061$ ✓ $200(121) - 11(649) = 17,061$ ✓

f) $20(x - 39) = 5x - 432; x = 23.2$ $20(23.2 - 39) = -316$ ✓ $5(23.2) - 432 = -316$ ✓