

SOLVING EQUATIONS Part III

Steps for solving equations

1. **simplify** each side of the equation.

This may require the distributive property, collecting like terms, clearing the fractions or a combination of these.

2. **Isolate** the variable term on one

side of the equal sign. This step is done by using the addition property of equality. Our goal is to get all the variable terms on one side of the equal sign and everything else on the other side.

3. **Isolate** the variable. This step is done using the multiplication property of equality.

4. **check your answer.** Once you have solved for the variable, plug in its value into the original equation to verify that you get a **TRUE** statement.

example 1: $4(x-8)+2 = 2(x-4)$

• step 1: Simplify each side of the equation.

$$4(x) - 4(8) + 2 = 2(x) - 2(4)$$

$$4x - 32 + 2 = 2x - 8$$

$$4x - 30 = 2x - 8$$

• step 2: Isolate the variable term.

$$4x \quad \quad \quad +30 \quad \quad \quad +30$$

$$4x \quad \quad \quad = 2x + 22$$

$$-2x \quad \quad \quad -2x$$

$$\underline{2x} = \underline{22}$$

• step 3: Isolate the variable.

$$\frac{2x}{2} = \frac{22}{2}$$

$$x = 11$$

• step 4: check your answer.

$$4(11-8)+2 = 2(11-4)$$

$$4(3) + 2 = 2(7)$$

$$12 + 2 = 14$$

$$14 = 14$$

Since $14=14$ is a TRUE statement, our solution $x=11$ is correct.

example 2: $\frac{3}{5}t - 2 = \frac{11}{10}t - \frac{7}{2}$

↳ LCD =

multiply both sides of the equation by the LCD.

$$10 \left[\frac{3}{5}t - 2 \right] = 10 \left[\frac{11}{10}t - \frac{7}{2} \right]$$

$$10 \left(\frac{3}{5}t \right) - 10(2) = 10 \left(\frac{11}{10}t \right) - 10 \left(\frac{7}{2} \right)$$

$$6t - 20 = 11t - 35$$
$$\quad + 20 \qquad \qquad + 20$$

$$6t = 11t - 15$$

$$\underline{-11t} \qquad \qquad \underline{-11t}$$

$$\underline{-5t} = \underline{-15}$$

$$\underline{-5} \qquad \qquad \underline{-5}$$

$$t = 3$$

checking $t=3$:

$$\frac{3}{5}(3) - 2 = \frac{11}{10}(3) - \frac{7}{2}$$

$$\frac{9}{5} - 2 = \frac{33}{10} - \frac{7}{2}$$

$$10 \left(\frac{9}{5} - 2 \right) = 10 \left(\frac{33}{10} - \frac{7}{2} \right)$$

$$10 \left(\frac{9}{5} \right) - 10(2) = 10 \left(\frac{33}{10} \right) - 10 \left(\frac{7}{2} \right)$$

$$18 - 20 = 33 - 35$$

$$\underline{-2} = \underline{-2} \quad \text{TRUE!}$$

Therefore $t=3$ is the solution.

SOLVING EQUATIONS Part III Practice Problems

Solve each equation.

1. $3(5-x) - 3 = 4(x+2) - 10$

2. $-\frac{1}{3}d - \frac{1}{4} = \frac{1}{12}d + \frac{1}{3}$