Objective 1: Solving Linear Equations Using Properties of Equality

Linear Equation in one variable

The solution set of a linear equation is:

Equivalent equations are:

What we want to do.
Our goal will be to transform an equation in one variable (here we assume it is x, but it could be any other letter) to equivalent equations until we get to one of the following outcomes representing three conclusions about the solution to our equation:

$x = b$ In this case there is only **one solution** to the equation, the number b

$a = b$ Where a and b are **not** the same number and the variable x has been eliminated.

In this case there is **no solution** to the equation.

$x = x$ or $a = a$ Where x is a variable or a is some real number.

In this case the result is called an **identity**

which implies **every number** is a solution.

IMPORTANT!!!! To accomplish this goal, we will make REPEATED USE THROUGH-OUT THIS COURSE of the following two principles, so it is VERY important that you understand them and learn to both use them AND to recognize their use!

The addition property of equality

The multiplication property of equality

Objective 2: Solving Linear Equations that can be simplified by combining like terms

(1) **Examples:** Solve using the addition and multiplication principles.

(a) $2x + 5 = 9$ (b) $0.6 = 2 - 3.5c$

(c) $2.5 = 3 - 2.5t$

(d) $-4x - 1 + 5x = 9x + 3 - 7x$

(e) $2(x - 3) = 5x - 9$

Objective 3: Solving Linear Equations containing fractions or decimals

(a) $\dfrac{y}{3} - \dfrac{y}{4} = \dfrac{1}{6}$

(b) $\dfrac{x+5}{2} + \dfrac{1}{2} = 2x - \dfrac{x-3}{8}$

(c) $0.3x + 0.1 = 0.27x - 0.02$

Objective 4: Recognizing Identities and equations with No Solution

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

(c) $5x - 2 = 3 + 5(x - 1)$

Additional Notes