SYSTEMS OF EQUATIONS: AN INTRODUCTION

❑ *TWO EQUATIONS IN TWO VARIABLES*

Here's an example of a ***system of two equations in two variables***:

$$\begin{aligned} x + y &= 10 \\ 2x - 3y &= 5 \end{aligned}$$

The *two equations* are easy to see, as are the *two variables*. The term *system* refers to the fact that these two equations are tied together -- our final solution must be a pair of numbers, one of x and one for y, which satisfy <u>both</u> equations.

For example, in the system above, the values $x = 8$ and $y = 2$ <u>will</u> satisfy the first equation [8 + 2 = 10], but will <u>not</u> satisfy the second equation [2(8) – 3(2) = 16 – 6 = 10, not 5]. Therefore, $x = 8$ and $y = 2$ is <u>not</u> a solution to the *system* of equations.

But $x = 7$ and $y = 3$ <u>is</u> a solution of the system of equations. Here's why:

$7 + 3 = 10$ ✓ and $2(7) - 3(3) = 14 - 9 = 5$ ✓

Homework

1. Consider the system of equations: $\begin{aligned} a + b &= 9 \\ a - b &= 7 \end{aligned}$

   a. Show that $a = 5$ and $b = 4$ is a solution of the first equation, but is <u>not</u> a solution of the system.

   b. Show that $a = 20$ and $b = 13$ is a solution of the second equation, but is <u>not</u> a solution of the system.

   c. Show that $a = 8$ and $b = 1$ <u>is</u> a solution of the system.

2. Try to solve the system $\begin{aligned} u + w &= 12 \\ u - w &= 0 \end{aligned}$ by guessing.

Now try the system $\begin{aligned} 3x - 17y &= 200 \\ -5x - 12y &= 29 \end{aligned}$ by guessing (just kidding!).

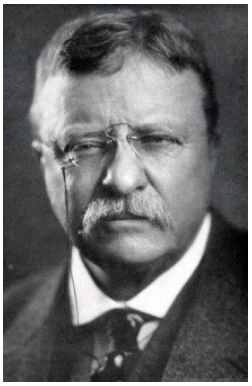
Solutions

1. a. $5 + 4 = 9$ ✓ But $5 - 4 = 1 \neq 7$.

b. $20 - 13 = 7$ ✓ But $20 + 13 = 33 \neq 9$.

c. $8 + 1 = 9$ ✓ And $8 - 1 = 7$ ✓

2. Both variables = 6, since 6 + 6 = 12, and 6 – 6 = 0.



"To educate a man in mind and not in morals is to educate a menace to society."

Theodore Roosevelt
(1858–1919)