

Solving Systems of Equations - Substitution

A.REI.6 – Solving systems exactly and
approximately

Agenda

Homework:

- Substitution Worksheet
- PMN Summary
- AM

Materials:

- Notebook
- Calculator (if needed)

DO NOW:

On the next open page of your notebook:

Set up Power Math Notes (PMN)



Set up Power Math Notes (see example below)

| | |
|--|----------------------------|
| Name: Date: Period: Topic: Solving Systems of Equations – Substitution Method | |
| Toolbox: <i>(leave about 8 lines)</i> | Summary/Reflection: |
| Study Questions: | Workspace: |



Toolbox

Step 1

- Solve 1st equation for one variable

Step 2

- Substitute into 2nd equation

Step 3

- Solve 2nd equation

Step 4

- Plug answer into 1st equation to calculate the other variable

Step 5

- CHECK your solution

The Puzzle Box






Example #1 – One equation is already solved for a variable



$$x + y = 5$$

$$y = 3 + x$$




$$x + 3 + x = 5$$

$$y = 3 + 1$$

$$y = 4$$

Answer: (1, 4)

$$\begin{array}{r}
 x + 3 + x = 5 \\
 \hline
 2x + 3 = 5 \\
 -3 \quad -3 \\
 \hline
 2x = 2 \\
 \frac{2x}{2} = \frac{2}{2}
 \end{array}$$


$$x = 1$$

Check your answer!



Example #2 – Need to solve for a variable first



| | |
|---|---------------|
| $2x + y = 4$ | |
| $-2x$ | $-2x$ |
| <hr/> | |
|  | $y = -2x + 4$ |

| |
|----------------|
| $2x + y = 4$ |
| $3x + 2y = 10$ |



$$3x + 2(-2x + 4) = 10$$

| | | | | |
|-------|-------|------|-----|------|
| $3x$ | $-4x$ | $+8$ | $=$ | 10 |
| $-x$ | | $+8$ | $=$ | 10 |
| | | -8 | $=$ | -8 |
| <hr/> | | | | |
| $-x$ | | | $=$ | 2 |
| -1 | | | $=$ | -1 |

$$y = -2(-2) + 4$$

$$y = 8$$

Answer: (-2, 8)

| |
|----------|
| $x = -2$ |
|----------|


Check your answer!



Example #3 – Special case



$$\begin{array}{r|l} 2x + y = 4 & \\ -2x & -2x \\ \hline & \end{array}$$

 $y = -2x + 4$

$$\begin{array}{l} 2x + y = 4 \\ 4x + 2y = 8 \end{array}$$


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

$$\begin{array}{rcl} 4x - 4x + 8 & = & 8 \\ 8 & = & 8 \end{array}$$

Answer: Infinite Solutions



Example #4 – Special Case

$$y = 2x - 5$$
$$y = 2x + 3$$


$$\begin{array}{r} 2x + 3 \\ - 2x \\ \hline 3 \end{array} = \begin{array}{r} 2x - 5 \\ - 2x \\ \hline -5 \end{array}$$

~~$3 = -5$~~

Answer: NO SOLUTION

Mini Quiz

$$y = 3x - 2$$

$$2x + 3y = 16$$