

Section 6.3: Solving Systems:

Friday, April 5, 2019 1:51 PM

Addition (Elimination)

example: solve

$$\begin{cases} -x + y = 2 \\ + (x + y = 4) \end{cases}$$

add these equations

$$0x + 2y = 6$$

$$2y = 6$$

$$y = 3$$

sub into

$$x + y = 4$$

$$x + 3 = 4$$

$$x = 1$$

solution is $(1, 3)$

why did this work?

$$\begin{cases} -x + y = 2 \\ +x + y = 4 \end{cases}$$

↑
coefficients have opposite signs
and same absolute value

example:

$$\begin{cases} 5x - 3y = 14 \\ 2x - y = 6 \end{cases}$$

← multiply entire equation by -3

by -3

$$\begin{array}{r} 5x - 3y = 14 \\ -6x + 3y = -18 \\ \hline \end{array}$$

now add

$$\begin{array}{r} -x \qquad \qquad = -4 \\ \qquad \qquad \qquad x = 4 \end{array}$$

now substitute to find y:

$$\begin{array}{r} 2x - y = 6 \\ 2(4) - y = 6 \\ 8 - y = 6 \\ -y = -2 \\ y = 2 \end{array}$$

solution: (4, 2)

example:

solve:

$$\begin{cases} x + 2y = 10 \\ 3x - 2y = 6 \end{cases}$$

add

$$\begin{array}{r} 4x \qquad \qquad = 16 \\ \qquad \qquad \qquad x = 4 \end{array}$$

$$\begin{array}{r} x + 2y = 10 \\ 4 + 2y = 10 \\ 2y = 6 \\ y = 3 \end{array}$$

solution is (4, 3)

example:

solve

$$\begin{cases} 2x - y = 13 \\ 4x + 9y = -7 \end{cases}$$

mult by -2

$$\begin{array}{r} -4x + 2y = -26 \\ 4x + 9y = -7 \\ \hline \end{array}$$

$$\begin{array}{r} 11y = -33 \\ y = -3 \end{array}$$

$$2x - y = 13$$

$$2x - (-3) = 13$$

$$2x + 3 = 13$$

$$2x = 10$$

$$x = 5$$

solution $(5, -3)$