

System of equations (substitution)**Example 1:****Simplify** $4x - 2y = 2$, $2x + y = -5$?

Problem	$4x - 2y = 2$ $2x + y = -5$
1. Find the lone variable	Second Equation, y $2x + y = -5$
2. Solve for the lone variable	$-2x$ $-2x$ $y = -5 - 2x$
3. Substitute into the untouched equation	$4x - 2(-5 - 2x) = 2$
4. Solve	$4x + 10 + 4x = 2$ $8x + 10 = 2$ $\quad -10 \quad -10$ $8x = -8$ $\frac{8x}{8} = \frac{-8}{8}$ $x = -1$
5. Plug into lone variable equation and evaluate	$y = -5 - 2(-1)$ $y = -5 + 2$ $y = -3$
Solution	$(-1, -3)$

Practice:

Solve each system by substitution.

1) $y = -3x$

$y = 6x - 9$

2) $y = x + 5$

$y = -2x - 4$

3) $y = -2x - 9$

$y = 2x - 1$

4) $y = -6x + 3$

$y = 6x + 3$

5) $y = 6x + 4$

$y = -3x - 5$

6) $y = 3x + 13$

$y = -2x - 22$

7) $y = 3x + 2$

$y = -3x + 8$

8) $y = -2x - 9$

$y = -5x - 21$

9) $y = 2x - 3$

$y = -2x + 9$

10) $y = 7x - 24$

$y = -3x + 16$

11) $y = 6x - 6$

$-3x - 3y = -24$

12) $-x + 3y = 12$

$y = 6x + 21$

17- System of equations (Elimination)

Example 1:

Simplify $3x - 4y = 8$, $5x + 4y = -24$?

$$3x - 4y = 8$$

$$5x + 4y = -24$$

$$\underline{8x} \quad = -16$$

$$\underline{8} \quad \quad \underline{8}$$

$$x = -2$$

Notice opposites in front of y 's. Add columns.

Solve for x , divide by 8

We have our x !

$$5(-2) + 4y = -24$$

Plug into either original equation, simplify

$$-10 + 4y = -24$$

Add 10 to both sides

$$\underline{+10} \quad \quad \underline{+10}$$

$$4y = -14$$

Divide by 4

$$\underline{4} \quad \quad \underline{4}$$

$$y = \frac{-7}{2}$$

Now we have our y !

$$\left(-2, \frac{-7}{2} \right)$$

Our Solution

Practice:

Solve each system by elimination.

1) $4x + 2y = 0$

$$-4x - 9y = -28$$

2) $-7x + y = -10$

$$-9x - y = -22$$

3) $-9x + 5y = -22$

$$9x - 5y = 13$$

4) $-x - 2y = -7$

$$x + 2y = 7$$

5) $-6x + 9y = 3$

$$6x - 9y = -9$$

6) $5x - 5y = -15$

$$5x - 5y = -15$$

7) $4x - 6y = -10$

$$4x - 6y = -14$$

8) $-3x + 3y = -12$

$$-3x + 9y = -24$$

9) $-x - 5y = 28$

$$-x + 4y = -17$$

10) $-10x - 5y = 0$

$$-10x - 10y = -30$$

11) $2x - y = 5$

$$5x + 2y = -28$$

12) $-5x + 6y = -17$

$$x - 2y = 5$$