

Date: _____

Solving Systems of Equations by Elimination

Recall:

The solution to a system of equations is the point where the lines cross.

You can solve by graphing or by substitution.

Like terms: terms with the same variables and the same exponents

Coefficient: number in front of the variable

Example: Given $-4x$, the coefficient is -4

You can add or subtract equations as long as like terms are lined up.

Example 1

Add. Do not solve.

$$3x + 2y = 5$$

$$4x - 2y = -4$$

$$-x - 3y = 7$$

$$x - 6y = 2$$

Example 2

Subtract. Do not solve.

$$5x + 6y = 5$$

$$5x - 2y = -4$$

$$3x - 3y = 7$$

$$2x - 3y = 2$$

The coefficients of the variable that was eliminated had the same number and the same sign.

To eliminate a variable:

Add if the signs are opposite

Subtract if the signs are the same

Example 3

For each system decide whether you should add or subtract to eliminate a variable.

$$6x - 2y = -1$$

$$-5x - y = 4$$

$$5x - 3y = 6$$

$$7x - 2y = 12$$

$$5x + 3y = 2$$

$$7x + 3y = 1$$

$$2x + 7y = 3$$

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

$$-x - y = 2$$

$$2x - 5y = 8$$

$$-6x + 2y = 3$$

$$x - 2y = 4$$

Example 4

Solve each system by elimination.

Steps:

1. Line up the equations in $Ax + By = C$ form.
2. Add or subtract the equations to eliminate one variable.
3. Solve for the remaining variable.
4. Substitute the answer into one of the original equations to solve for the 2nd variable.
5. Write your answer as an ordered pair (x, y) .

a)

$$3x + 2y = 18$$

$$4x - 2y = -4$$

b)

$$-x - 3y = 7$$

$$x - 6y = 2$$

c)

$$5x + 6y = 20$$

$$5x - 2y = -4$$

Homework:

1. For each system of equations, solve by elimination.

a. $x + y = 4$

$x - 2y = 1$

b. $x + 2y = 0$

$x - y = 3$

c. $2x + y = 1$

$x + y = 2$

d. $3x - y = 3$

$y - 2x = -2$

e. $3x - 2y = 4$

$x - 2y = 4$

f. $4x + y = 13$

$4x - y = 11$

g. $x + 2y = 0$

$x - 2y = -4$

h. $5x + 2y = 5$

$3x - 2y = -13$

Answers:

1.

a. $(3,1)$

b. $(2,-1)$

c. $(-1,3)$

d. $(1,0)$

e. $(0,-2)$

f. $(3,1)$

g. $(-2,1)$

h. $(-1,5)$