Date: _____

Solving Systems of Equations by Elimination

Recall:

To eliminate a variable, the numbers in front must be the same...

Add if the signs are opposite

Subtract if the signs are the same

Example 1

Solve.

$3x - 4y = -1$

$3x + 2y = 23$

Example 2

Solve.

$x + 2y = 2$

$3x + 5y = 4$

Neither variable has the same coefficient in both equations.

We have to multiply one of the equations by a constant.

To get the same coefficient of x in both equations, multiply both sides of equation:

Now solve the new system of equations:

Steps:

1. Line up the equations in $Ax + By = C$ form.
2. Multiply one equation by a constant so that one variable has the same number in front of it in both equations.
3. Add or subtract the equations to eliminate one variable.
4. Solve for the remaining variable.
5. Substitute the answer into one of the original equations to solve for the 2nd variable.
6. Write your answer as an ordered pair (x, y).

$3x + 5y = 12$
$2x - y = -5$

$2x - 3y = -12$
$6x + 5y = -8$

Example 5

Solve.

You can multiply each equation by a different number to make the coefficients the same.

$4x - 7y = 19$

$3x - 2y = 11$

Homework:

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

a. $2x + y = 3$
$3x + 2y = 5$

b. $3a - 2b = 10$
$3a - b = 35$

c. $x - 3y = 11$
$2x + 10y = 6$

d. $6x + 3y = 12$
$-2x + y = -16$

e. $3x - 2y = 14$
$x - 5y = -4$

f. $6x - y = 1$
$3x - 2y = 2$

g. $x - 2y = -6$
$3x - 2y = -6$

h. $4a - 3b = -16$
$4a + b = 0$

i. $3x - y = -3$
$8x - 3y = -12$

Answers:

1.

a. $(1,1)$

b. $(20,25)$

c. $(8,-1)$

d. $(5,-6)$

e. $(6,2)$

f. $(0,-1)$

g. $(0,3)$

h. $(-1,4)$

i. $(3,12)$