

Date: _____

Solving Systems of Equations by Substitution

Disadvantages of Solving by Graphing:

1. Slow, takes time
2. Can be inaccurate

Advantages of an Algebraic Method:

1. Accuracy

Substitute $x = 5$ in $y = 3x - 1$

Substitute $x = \odot$ in $y = 3x - 1$

Substitute $x = \odot + \star$ in $y = 3x - 1$

Example 1

Solve the following system by substitution.

$$2x - 3y = 13$$

$$x - 2y = 7$$

Solving by Substitution

1. Isolate a variable in one equation
2. Substitute to create an equation with only one variable.
3. Solve the equation.

4. Substitute the solved variable into the equation from step 1 to determine the value of the other variable.
5. Write a conclusion.
6. Check – formal if asked, otherwise complete a mental check.

Example 2

Solve the following system by substitution.

$$3x + y = 4$$

$$2x - 5y = 14$$

Example 3

Solve the following system.

$$3x - y = -12$$

$$4x - 2y = -20$$

Homework

1. Solve for y in terms of x.

a. $3x + y = 12$

b. $y - 4x = 15$

c. $24x - 12y = 48$

2. Solve for x in terms of y.

a. $x + 3y = 5$

b. $3y = 8 - x$

c. $7y - x + 6 = 0$

3. For each system of equations, solve by substitution.

a. $y = x - 1$
 $y = 2x - 3$

b. $x = -2y + 3$
 $x = 3y - 7$

c. $y = x - 1$
 $y = 3 - 3x$

d. $3x - 2y = -5$
 $x = y - 2$

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

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

g. $5x + 2y = 18$
 $2x + 3y = 16$

h. $y = 3x - 8$
 $5x + y = 8$

i. $3x - 5y = 19$
 $y - 2x = 7$

Answers

1.

a. $y = -3x + 12$

b. $y = 4x + 15$

c. $y = 2x - 4$

2.

a. $x = -3y + 5$

b. $x = -3y + 8$

c. $x = 7y + 6$

3.

a. (2,1)

b. (-1,2)

c. (1,0)

d. (-1,1)

e. (1,2)

f. (2,1)

g. (2,4)

h. (2,-2)

i. (3,-2)