

Algebra I

Notes Section 6.5

Solve Special Types of Linear Systems

Big Ideas

- How to solve a system of equations with one solution, no solutions or infinitely many solutions with all three methods: graphing, substitution, or linear combination.

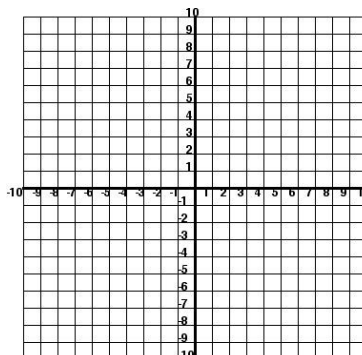
Inconsistent System: a linear system with **NO** solution.

Consistent Dependent System: a linear system with infinitely many solutions.

EXAMPLE 1 Show that the linear system has no solution by all three methods.

a) $3x + 2y = 10$
 $3x + 2y = 2$

Method: **Graphing**



b) $2x - 3y = 6$
 $2x - 3y = -4$

Method: **Substitution**

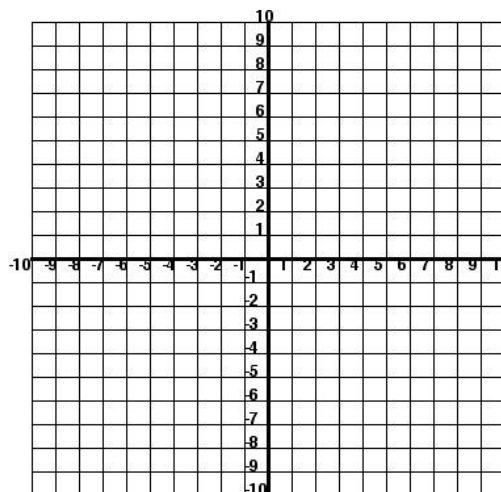
$$\begin{aligned} \text{c) } 5x + 3y &= 6 \\ -5x - 3y &= 3 \end{aligned}$$

Method: Linear Combination

EXAMPLE 2 Show that the linear system has infinitely many solutions using all three methods.

$$\begin{aligned} \text{a) } x - 2y &= -4 \\ y &= \frac{1}{2}x + 2 \end{aligned}$$

Method: Graphing



$$\begin{aligned} \text{b) } 4x - 2y &= 8 \\ y &= 2x - 4 \end{aligned}$$

Method: Substitution

$$\begin{aligned} \text{c) } y &= 2x - 4 \\ -6x + 3y &= -12 \end{aligned}$$

Method: Linear Combination

Number of solutions	Slopes and y-intercepts
One solution	Different slopes
No solution	Same slope Different y-intercepts
Infinitely many solutions	Same slope Same y-intercept

EXAMPLE 3 Without solving the linear system, tell whether the linear system has one solution, no solution or infinitely many solutions.

a) $5x + y = -2$
 $-10x - 2y = 4$

b) $6x + 2y = 3$
 $6x + 2y = -5$

c) $2x + 3y = -9$
 $x - 2y = 6$

EXAMPLE 4 An artist wants to sell prints of her paintings. She orders a set of prints for each of two of her paintings. Each set contains regular prints and glossy prints, as shown in the table. Find the cost of one glossy print.

a) Write a system of equations.

Regular	Glossy	Cost
45	30	\$465
15	10	\$155

b) Solve.