

MATH 1314

Section 6.1, 6.2

Solving 2 x 2 Linear Systems

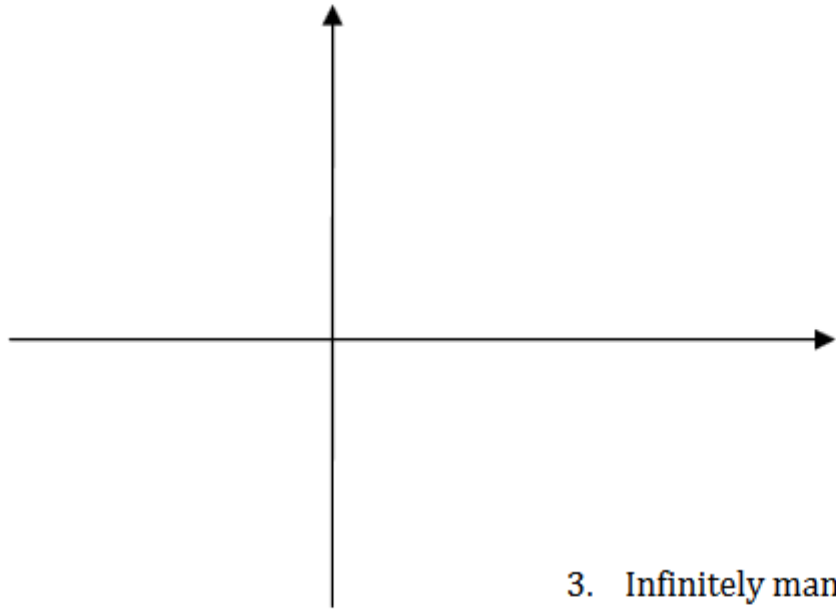
To solve a system of two linear equations

$$\begin{cases} ax + by = c \\ dx + ey = f \end{cases}$$

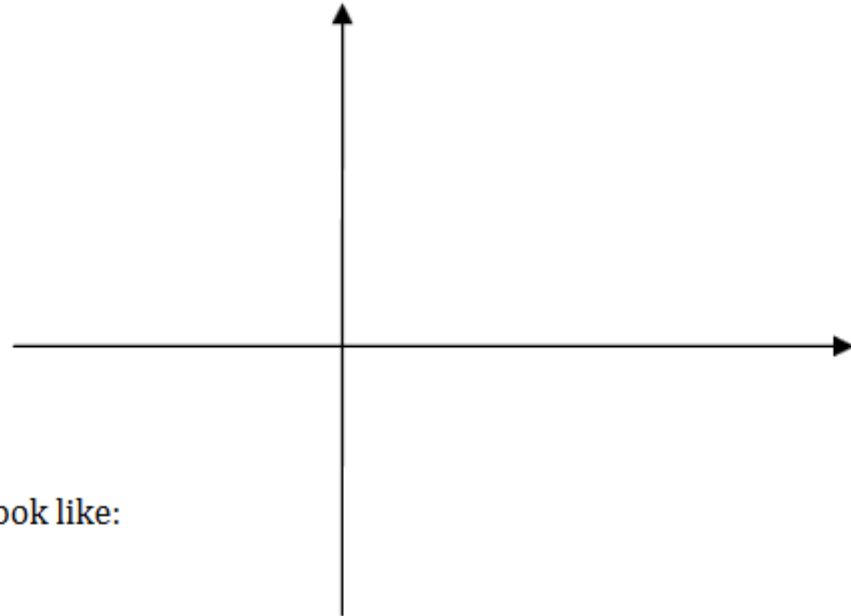
means to find values for x and y that satisfy both equations.

The system will have exactly one solution, no solution, or infinitely many solutions.

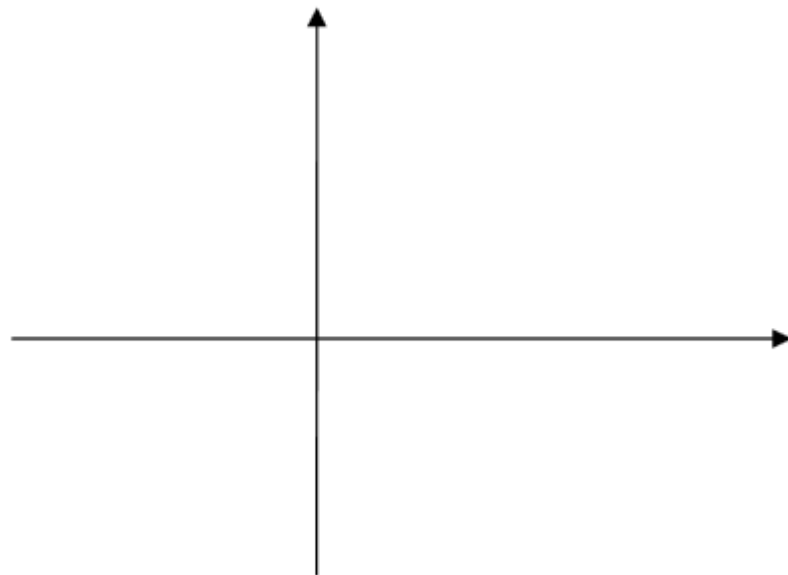
1. Exactly one solution, will look like:



2. No solution, will look like:



3. Infinitely many solutions, will look like:



Example 1: Solve the following systems of linear equations by the substitution method.

$$2x - y = 5$$

$$5x + 2y = 8$$

Example 2 : Solve the following systems of linear equations by the substitution method

$$x - 2y = 3$$

$$2x - 4y = 7$$

Example 3: Solve the following systems by the Elimination Method.

$$2x + 3y = -16$$

$$5x - 10y = 30$$

Example 4: Solve the following systems by the Elimination Method.

$$x + 4y = 10$$

$$\frac{1}{2}x + 2y = 5$$

$$x^2 + y = 120$$

$$x^2 - y = 80$$

Application Question:

Two integers have a sum of 35. The difference when subtracting the larger from twice the smaller is 10. What are the two numbers?

A parking garage for a concert venue needs to report to the local safety board the percent of motorcycles that were parked in the garage on the night a certain event. That night, the garage sold parking passes to a total of 340 vehicles (included cars: charged \$10 each, seating 4; motorcycles: charged \$5 each, seating 1; and busses: charged \$25 each, seating 20). The parking garage earned \$3275 for selling parking tags that evening, and was able to accommodate 1355 ticket holders. What percent of vehicles parked were motorcycles?

Create an equation *[Eq 1]* for the total number of vehicles parked?

Create an equation *[Eq 2]* for the total money earned by the garage?

Create an equation *[Eq 3]* for the total number of ticket holders?

Solve *Eq 3* for m .

Substitute your answer to Question 4 into *Eq 1* and *Eq 2* and simplify.

Solve *Eq 2* for c .

Substitute your answer to Question 6 into *Eq 1* and simplify.

Solve *Eq 1* for b .

Solve for c and m .

What number should be reported to safety board, round to the nearest whole number, calculator is acceptable? (Look back at the original equation)