Lesson 94 Objective: SWBAT solve multi-variable systems of equations.

Kickoff

Solve the following by elimination.

$$-4(-7x-8y=9)$$
$$7(-4x+9y=-22)$$

$28x + 32y = -36$
$+ -28x + 63y = -154$

$\frac{95y}{95} = \frac{-190}{95}$

$y = -2$

$-7x - 8y = 9$
$-7x - 8(-2) = 9$
$-7x + 16 = 9$
$-16 \quad -16$
$\frac{-7x}{-7} = \frac{-7}{-7}$
$x = 1$

$(1, -2)$

Apr 19-6:56 AM

Homework

Apr 19-6:58 AM

Multi-Variable Systems

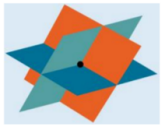
What is a multi-variable system?

- When you're solving a system of equations with three or more variables, you are solving for the intersection (if any) between three planes.

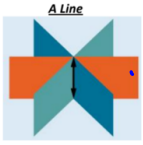
Types of Intersections

Consistent Systems *have at least one point of intersection for all three planes*

A Point



A Line



Inconsistent Systems *do not have any points of intersection for all three planes.*

No Intersections

Apr 19-6:55 AM

Steps to Solve Algebraically:

1) Pick any **two pairs** of equations from the system.
2) Eliminate the same variable from **each pair**. You will have two new equations.
3) Use the two equations found in step 2 and create a new system of equations and solve. At this point you will have **solved for one of the variables.**
4) Substitute the variable found in step 3 back into one of the two equations from step 2. At this point you will have **solved for another variable.**
5) Take the two variables found from steps 3 and 4 and plug them into one of the original equations. At this point you will have found the **last variable.**
6) Check by plugging all solutions into all three equations.

Apr 19-6:56 AM

Example 1: Solve the system of equations algebraically for x, y and z.

$4x - 3y + z = -10$
$2x + y + 3z = 0$
$-x + 2y - 5z = 17$

① $4x - 3y + z = -10$
② $2(2x + y + 3z = 0)$
$4x - 3y + z = -10$
$-4x - 2y - 6z = 0$
Ⓐ $-5y - 5z = -10$

② $2x + y + 3z = 0$
③ $(-x + 2y - 5z = 17)$
$2x + y + 3z = 0$
$-2x + 4y - 10z = 34$
Ⓑ $5y - 7z = 34$

$-5y - 5z = -10$
$5y - 7z = 34$
$-12z = 24$
$z = -2$

Ⓐ $-5y - 5(-2) = -10$
$-5y + 10 = -10$
$-5y = -20$
$y = 4$

① $4x - 3y + z = -10$
$4x - 3(4) + (-2) = -10$
$4x - 12 - 2 = -10$
$4x - 14 = -10$
$+14 \quad +14$
$\frac{4x}{4} = \frac{4}{4}$
$x = 1$

$(1, 4, -2)$

Apr 19-6:56 AM

Example 2: Solve the system of equations algebraically for x, y and z.

$x - 2y + 3z = 7$
$2x + y + z = 4$
$-3x + 2y - 2z = -10$

$(2, -1, 1)$

Practice

① $(2, -3, 0)$

Apr 19-6:56 AM

Fix these:

② ① $5a+6b-4c=30$

④ ③ $-4r-5s-2t=4$

⑤ ② $-5a-6b+4c=-29$

③ $-2a-3b-c=-16$

⑥ ③ $6x+4y-4z=8$

Apr 19-1:35 PM