How would you solve this system of equations using matrices?

Y = 5X - 13.85

$-5X + Y = -13.85$

Y = 7.42

A

$$\begin{bmatrix} -5 & 1 \\ 0 & 1 \end{bmatrix}$$

B

$$\begin{bmatrix} -13.85 \\ 7.42 \end{bmatrix}$$

Equation in three variables ⟶ 3 Dimensions

$$2x + 3y + z = 6$$

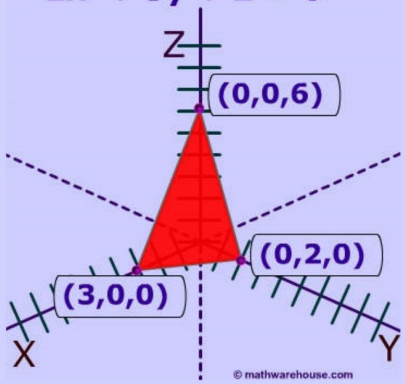
$x\text{-int} = 3$

$y\text{-int} = 2$

$z\text{-int} = 6$

What is a linear equation with 3 variables?

2x + 3y + Z = 6



It is a plane !

The picture on the left is the graph of the plane 2x + 3y + z = 6.

The red triangle is the portion of the plane when x, y, and z values are all positive. This plane actually continues off in the negative direction. All that is pictured is the part of the plane that is intersected by the positive axes (the negative axes have dashed lines).

What is a system of 3 variables equations?

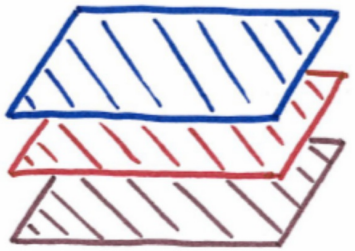
Just like a system of linear equations with 2 variables is more than 1 line, a system of 3 variable equations is just more than plane.

How many solutions could a system of equations with three variables have?

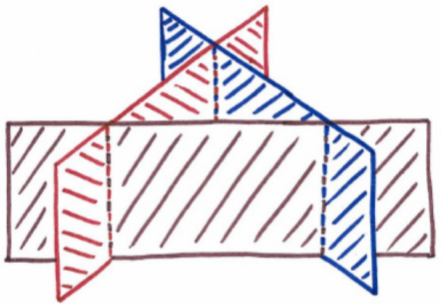
the same outcomes as a system of equations with two variables!

---------- No Solutions, 1 Solution or Infinite Solutions ----------

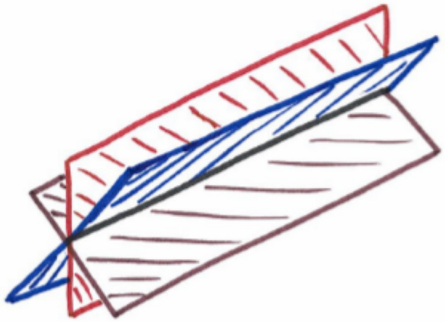
How many solutions? No Solution



How many solutions? No Solution

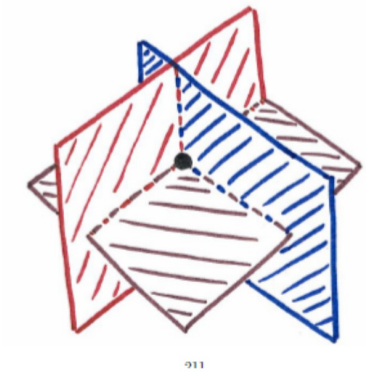


How many solutions? Many Solutions



How many solutions?

One Solution



How would you solve this system of equations in three variables?

Use matrices!

$$x + 3y - 5z = -24$$
$$7x + 4z = 48$$
$$-3x - 4y + z = -3$$

A (3x3) $\begin{bmatrix} 1 & 3 & -5 \\ 7 & 0 & 4 \\ -3 & -4 & 1 \end{bmatrix}$ B (3x1) $\begin{bmatrix} -24 \\ 48 \\ -3 \end{bmatrix}$ $\rightarrow$ $(4, -1, 5)$ (x, y, z)

1. The elevator can hold up to 2300 lbs.

$E \leq 2300$

2. The wheelbarrow can carry no more than 40 bricks.

$w \leq 40$

3. The employee needs at least 40 hours of work this week.

$E \geq 40$

4. The farmer is going to plant some corn.

$C > 0$

5. The rancher raises cows and goats. He can raise no more than 250 animals.

$C + G \leq 250$

6. It costs \$40 to produce a chair and \$75 to produce a table. The budget is \$2000.

$40C + 75T \leq 2000$

Write an equation to model this statement.

You can sell a painting for $45 each and a sculpture for $70 each.

$45p + 70s = T$