

MATH 1010 ~ Intermediate Algebra Chapter 4: SYSTEMS OF EQUATIONS

4.3: LINEAR SYSTEMS IN 3 VARIABLES

Objectives:

- ↪ Solve systems of equations in row-echelon form by back-substituting.
- ↪ Solve systems of equations using Gaussian elimination
- ↪ Solve application problems using Gaussian elimination.

$$\begin{aligned} 3x - 2y + 4z &= -8 \\ 7y - 2z &= 6 \\ 3z &= 12 \end{aligned}$$

Row echelon form for a system of equations:

$$\begin{aligned} x - 2y + 3z &= 9 \\ y + 2z &= 5 \\ z &= 3 \end{aligned}$$

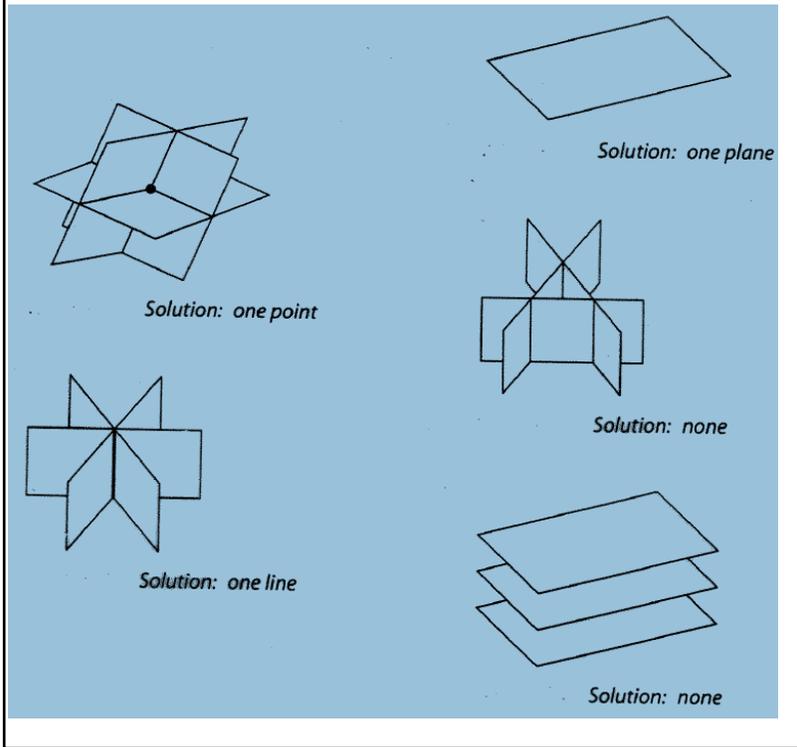
Three Elementary Row Operations:

1. Interchange two rows.
2. Multiply one row by a non-zero constant.
3. Add a multiple of one row to another row.

Use these operations to get this system of equations in row echelon form.

$$\begin{aligned} x - 2y + 3z &= 5 \\ -x + y + 5z &= 4 \\ 2x \quad - 3z &= 0 \end{aligned}$$

Possible solutions to a system of equations in three variables:



① EXAMPLE

Solve this system.

$$\begin{aligned}x - 2y + 2z &= 9 \\ -x + 3y &= -4 \\ 2x - 5y + z &= 10\end{aligned}$$

② EXAMPLE:
Solve this system.

$$\begin{aligned}x - 3y + z &= 1 \\2x - y - 2z &= 2 \\x + 2y - 3z &= -1\end{aligned}$$

③ EXAMPLE:
Solve this system.

$$\begin{aligned}x + y - 3z &= -1 \\y - z &= 0 \\-x + 2y &= 1\end{aligned}$$

④ EXAMPLE:

Write a set of equations to solve this problem.

The measure of one angle of a triangle is two-thirds the measure of a second angle.
The measure of the second angle is 12° greater than the measure of the third angle.
Find the measures of the three angles of the triangle.