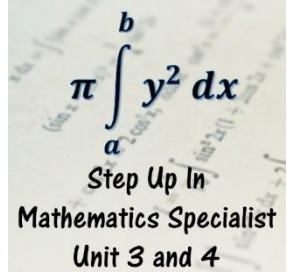


3.4 Systems of Linear Equations

Problems Worksheet



1. Consider the following system of equations.

$$\begin{cases} x - 2y + z = -1 \\ -x + 3y + z = 8 \\ x - y + 4z = 9 \end{cases}$$

- Write the system in augmented matrix form.
- Use the techniques of elementary row reduction to reduce the system to row echelon form.
- Determine the unique solution for the system of equations.

2. Consider the following system of equations.

$$\begin{cases} 4x + y + z = 4 \\ x - y + 2z = 11 \\ 2x + y + z = 4 \end{cases}$$

a. Write the system in augmented matrix form.

b. Use the techniques of elementary row reduction to reduce the system to row echelon form.

c. Determine the unique solution for the system of equations.

3. Consider the following system of equations.

$$\begin{cases} w + x + 2y - z = 6 \\ 2w - 2x + y + z = 4 \\ 3w - x - y - z = 4 \\ 2w + x + 3y + z = 5 \end{cases}$$

Determine the unique solution for this system.

4. Consider the following system of equations.

$$\begin{cases} a + 2b - 2c = -2 \\ 2a + b - c = 2 \\ -2a + 2b + pc = q \end{cases}$$

a. Write the system in augmented matrix form and hence reduce it to row echelon form.

b. Determine the value(s) of p and q so that the system has no solutions.

c. Determine the value(s) of p and q so that the system has infinite solutions.

d. Given that $p = 1$ and $q = -2$, determine the unique solution to this system.

5. Consider the following system of equations.

$$\begin{cases} -2x + y + 3z = -5 \\ x - y - z = 4 \\ -2x + 3y + p^2z = q \end{cases}$$

a. Write the system in augmented matrix form and hence reduce it to row echelon form.

b. Determine the value(s) of p and q so that the system has no solutions.

c. Determine the value(s) of p and q so that the system has infinite solutions.

