

Advanced Algebra

Unit 6: Advanced Systems of Equations

Assignment #4- 3 variables and 3 unknowns.

Using Elimination 3 times, find the solutions to the following three equations and three unknowns.

$$1) \begin{cases} x + y + z = 6 \\ 2x + 4y + z = 5 \\ 2x + 3y + z = 6 \end{cases}$$

Use 1 & 2

$$\begin{array}{r} x + y + z = 6 \\ -2x - 4y - z = -5 \\ \hline -x - 3y = 1 \end{array}$$

$$\begin{array}{r} -x + 3 = 1 \\ -x = -2 \\ \hline x = 2 \end{array}$$

$$(2, -1, 5)$$

2 & 3

$$\begin{array}{r} 2x + 4y + z = 5 \\ -2x - 3y - z = -6 \\ \hline y = -1 \end{array}$$

$$2) \begin{cases} x + 4y + 11z = 7 \\ x + 6y + 17z = 9 \\ x + 4y + 8z = 4 \end{cases}$$

Use 1 & 2

$$\begin{array}{r} x + 4y + 11z = 7 \\ -x + 6y + 17z = 9 \\ \hline -2y - 6z = -2 \end{array}$$

Use 2 & 3

$$\begin{array}{r} x + 6y + 17z = 9 \\ -x - 4y - 8z = -4 \\ \hline 2y + 9z = 5 \end{array}$$

$$(4, -2, 1)$$

$$\begin{array}{r} 3z = 3 \\ z = 1 \end{array}$$

$$3) \begin{cases} 2x + 3y + z = 22 \\ -3x + y + z = 4 \\ x + y + z = 12 \end{cases}$$

1 & 2

$$\begin{array}{r} 2x + 3y + z = 22 \\ 3x - y - z = -4 \\ \hline 5x + 2y = 18 \end{array}$$

$$\begin{array}{r} -10 + 2y = 18 \\ 2y = 28 \\ \hline y = 14 \end{array}$$

2 & 3

$$\begin{array}{r} -3x + y + z = 4 \\ -x - y - z = -12 \\ \hline -4y = -8 \\ y = 2 \end{array}$$

$$\begin{array}{r} -2 + 14 + z = 12 \\ z = 0 \end{array}$$

$$4) \begin{cases} 2x + 2y + z = 14 \\ -3x + y - z = -11 \\ 5x + 4y + z = 27 \end{cases}$$

1 & 2

$$\begin{array}{r} 2x + 2y + z = 14 \\ -3x + y - z = -11 \\ \hline -x + 3y = 3 \end{array}$$

2 & 3

$$\begin{array}{r} -3x + y - z = -11 \\ 5x + 4y + z = 27 \\ \hline 2x + 5y = 16 \end{array}$$

$$\begin{array}{r} 2x = 6 \\ x = 3 \end{array}$$

$$\begin{array}{r} -2x + 6y = 6 \\ 2x + 5y = 16 \\ \hline 11y = 22 \\ y = 2 \end{array}$$

$$\begin{array}{r} x \\ y \\ z \\ \hline (3, 2, 4) \end{array}$$