It is possible to solve systems of equations with more than two variables using matrices. One way to do this is to use augmented matrices – the other is to use matrices on a graphing calculator. We are going to focus on the second method and leave the first method for those interested in getting extra credit.

Example: Solve this system of equations using matrices and a graphing calculator.

\[
\begin{align*}
2x + 3y + 2z &= 3 \\
4x + 2y + 3z &= 2 \\
3y + 4z &= 2 \\
2y + 3w &= -2 \\
3z - 2w &= 1
\end{align*}
\]

1. First, rewrite the system of equations as a matrix equation.

2. Then, enter the coefficient matrix and the answer matrix into the calculator.
3. Use the calculator to find the inverse of the coefficient matrix. (You may have to convert the decimal elements into fractions.)

4. Write the next step of the matrix equation.

5. Use your graphing calculator to solve the matrix equation.

6. Write the solution to the matrix equation. (You may have to convert decimal elements into fractions.)