

MORE PRACTICE WITH MATRICES

Math 10 · Mr. Merrick · February 2, 2026

1. Turn the following system into an augmented matrix:

$$\begin{aligned}2x - 3y &= 7 \\ -x + 4y &= -5\end{aligned}$$

2. Start with

$$\left[\begin{array}{ccc} 1 & -2 & 5 \\ 3 & 0 & -6 \\ -1 & 4 & 2 \end{array} \right]$$

Perform each operation one after another, writing the full matrix after each step:

- (a) $R_2 \leftarrow R_2 - 3R_1$
- (b) $R_3 \leftarrow R_3 + R_1$
- (c) swap R_2 and R_3

3. Solve the system using row reduction:

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

4. Solve the system:

$$\begin{aligned}x + y + z &= 6 \\2x - y + z &= 3 \\-x + 2y + z &= 5\end{aligned}$$

5. The reduced row-echelon form of an augmented matrix is:

$$\left[\begin{array}{ccc|c} 1 & 0 & 2 & 4 \\ 0 & 1 & -1 & 3 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

Describe the solution set.

6. A row-reduction ends with:

$$\left[\begin{array}{cc|c} 1 & 0 & 2 \\ 0 & 1 & -1 \\ 0 & 0 & 5 \end{array} \right]$$

What does this tell you about the system?

7. Solve the equation and describe the solution set:

$$3x - 6y = 12$$

8. Determine the value(s) of k for which the system has a unique solution, no solution, or infinitely many solutions:

$$\begin{aligned}x + 2y &= 6 \\ 2x + ky &= 12\end{aligned}$$

9. Determine the value(s) of k for which the system has no solution:

$$\begin{aligned}2x - 3y &= 1 \\ 4x - 6y &= k\end{aligned}$$

10. Determine the value(s) of k for which the system has a unique solution, no solution, or infinitely many solutions:

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

11. A cinema sells adult tickets for \$12 and student tickets for \$8. A total of 50 tickets were sold for \$480.

(a) Write a system of equations.

(b) Solve the system.

12. For the augmented matrix

$$\left[\begin{array}{ccc|c} 1 & 2 & -1 & 3 \\ 2 & 4 & -2 & k \\ 0 & 1 & 1 & 2 \end{array} \right]$$

determine the value(s) of k for which the system has infinitely many solutions, and the value(s) for which it has no solution.