

1. Use only the method of elimination to solve the following system of equations.

$$-4x + 5y = -2$$

$$2x + 3y = 4$$

2. Use only the substitution method to solve each of the following system of equations.

(a) $x - 3y = 2$

$$-2x + 5y = 5$$

(b) $x^2 + y^2 = 25$

$$x - 2y = 10$$

3. Use the method of elimination and/or substitution to solve the following system of equations.

$$5x - 3y - z = 4$$

$$2x - 3y + 4z = 36$$

$$-x + 6y - 3z = -34$$

4. Use only determinants to solve the following system of equations. Be sure to list the three determinants that must be calculated. **DO NOT REDUCE YOUR FRACTIONS.**

$$5x - 3y = 4$$

$$-2x + y = 5$$

5. Consider the system $3x + 2y + 5z = -4$

$$2x - 3y + z = -13$$

$$x + 2z = -5$$

(a) List the two matrices whose determinants would have to be calculated in order to find the value of “z” in the solution of this system.

(b) Use your calculator to calculate the determinants in part a and determine the value of “z” in the solution of this system.

(c) Use the substitution method to find the values of “x” and “y” in the solution of this system.

6. Each of the following augmented matrices is one step away from being in reduced row echelon form. List the step needed to complete the row reduction process and indicate whether the system represented by the augmented matrix has no solution, one solution or infinitely many solutions.

(a)
$$\begin{bmatrix} 1 & 3 & 2 & 4 \\ 0 & 1 & 1 & 2 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

(b)
$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

(c)
$$\begin{bmatrix} 1 & 0 & 0 & 5 \\ 0 & 4 & 0 & 8 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

Use the following matrices to work problems 7-10.

$$\mathbf{B} = \begin{bmatrix} 3 & -4 \\ 5 & 2 \end{bmatrix} \quad \mathbf{C} = \begin{bmatrix} 5 & -1 \\ 4 & 3 \\ 0 & -5 \end{bmatrix} \quad \mathbf{D} = \begin{bmatrix} 3 & -2 \\ -4 & 5 \\ -1 & 4 \end{bmatrix} \quad \mathbf{E} = \begin{bmatrix} 1 & -3 & 6 \\ 5 & 4 & -2 \end{bmatrix}$$

7. Find \mathbf{B}^{-1} . Write your answer as a scalar times a matrix with integer entries.

8. Determine \mathbf{CE} .

9. Determine \mathbf{EC} .

10. Determine $3\mathbf{C} - \mathbf{D}$

11. (a) If \mathbf{A} is a 2×3 matrix and \mathbf{AB} is a 2×4 matrix, what size is \mathbf{B} ?

(b) If \mathbf{A} is a 3×3 matrix and $2\mathbf{A} + \mathbf{B}$ is a 3×3 matrix, what size is \mathbf{B} ?

(c) If \mathbf{A} is a 3×5 matrix, \mathbf{C} is a 4×5 matrix, and \mathbf{ABC} is a 3×5 matrix, what size is \mathbf{B} ?

12. Consider the following system of equations.

$$5x - 3y - z = 4$$

$$2x - 3y + 4z = 36$$

$$-x + 6y - 3z = -34$$

- (a) What is the coefficient matrix associated with this system? Label your answer as A .
- (b) Determine A^{-1} . Write your answer as a scalar times a matrix with integer entries.
- (c) Write this system as a matrix equation.
- (d) What matrix product must be calculated to find the solution of this system?
- (e) Calculate the matrix product in part e and determine the solution of this system.

