

True/False. Write “True” or “False” in the blanks to the left for each statement.

1. _____ A matrix is a rectangular array of numbers.
2. _____ The size of a matrix is the number of rows by the number of columns in that order.
3. _____ A non-square matrix can have an inverse.
4. _____ Matrices allow us to solve systems of equations easier.
5. _____ Matrix multiplication is commutative.
6. _____ We can use $[A]^{-1}[B]$ to determine the solution of a system of equations.
7. _____ A system of equations always has a solution.
8. _____ The matrix which has properties similar to the number “1” is called the identity matrix.
9. _____ Every square matrix has an inverse.
10. _____ Any pair of matrices can be multiplied.

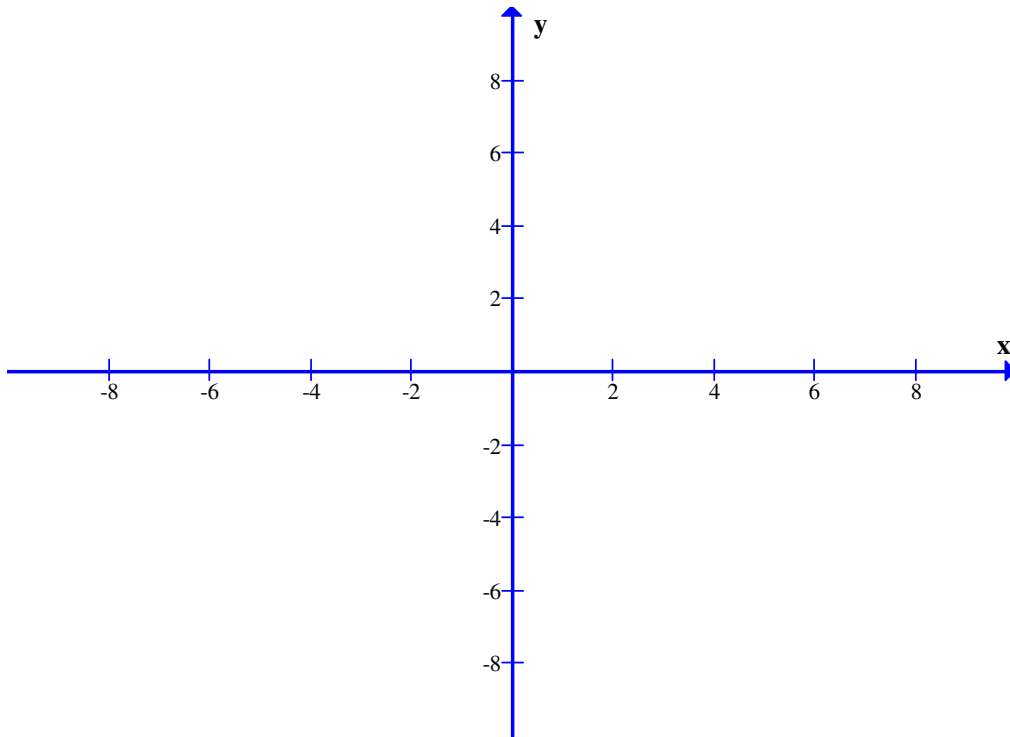
#11. Consider the 2 by 2 system:

$$2x - y = 5$$

$$5x + 2y = 8$$

- A. Solve the system by the **substitution method**.
- B. Solve the system by the **addition/elimination method**.
- C. Solve the system by **matrix algebra** $[A]^{-1}[B]$. **Show your coefficient matrix, variable matrix, and constant matrix.**

D. Graph the two lines and label the intersection point. It should reflect your previous solution point.



#12. Solve the following system **using algebraic row reductions and back-substitution**.

$$x - y - z = 1$$

$$-x + 2y - 3z + 4 = 0$$

$$3x - 7z - 2y = 0$$

#13. Repeat problem 12 **using matrix algebra** $[A]^{-1}[B]$. **Show your coefficient matrix, variable matrix, and constant matrix.**

#14. I had to buy my kids some clothes two months ago. Here is the damage.

3 blouses, 2 skirts, and 1 pair of jeans cost me \$292

4 blouses, 1 skirt, and 3 pairs of jeans cost me \$252

Oh yeah, each pair of jeans cost \$4 more than a blouse.

What did each item cost?

Solve using matrix algebra $[A]^{-1}[B]$. **Show your initial system and then your coefficient matrix, variable matrix, and constant matrix.**

#15. A long time ago in Liverpool, England, I decided to hire four people to play at my wedding for me. Their names were John, Paul, Ringo, and George. I would pay the entire band a total of \$45 to be split between them. After they finished playing and enjoying their refreshments I determined that John deserved twice as much as Paul. Paul and Ringo should get the same while George deserved half as much as what Paul should get. **How much did I pay each of these long hair hippie types?** Trivia: What is the name of the fifth Beatle and what is Ringo Stars real name?

Solve using matrix algebra $[A]^{-1}[B]$. Show your initial system and then your coefficient matrix, variable matrix, and constant matrix.

#16. Write the partial fraction decompositions for each of the following:

A. $\frac{4}{2x^2 - 5x - 3}$

$$\text{B. } \frac{x^2 + x}{(x+2)(x-1)^2}$$

$$\text{C. } \frac{2x+4}{x^3-1}$$