

**EXAM 4 (No Graphing Calculator)**

*INSTRUCTIONS: Solve each problem in the space provided. You must show **any** and **all** work for credit. Partial credit will be given based upon how you approached each problem and the work shown. Leave answers in exact, simplified form; do not give approximate answers unless otherwise directed. Circle your final answer for each problem.*

*TRUE OR FALSE: For Questions 1-4, indicate whether the statement is true or false.*

1. \_\_\_\_\_ To add two matrices, they must be of the same order.
2. \_\_\_\_\_ To multiply two matrices, they must be of the same order.
3. \_\_\_\_\_ Matrix multiplication is not commutative.
4. \_\_\_\_\_ In an identity matrix, every entry is equal to 1.

5. Perform each operation using the matrices shown below.

$$\mathbf{A} = \begin{bmatrix} 4 & 1 \\ -3 & -2 \end{bmatrix}$$

$$\mathbf{B} = \begin{bmatrix} -5 & 6 & 2 \\ 8 & -1 & 1 \end{bmatrix}$$

$$\mathbf{C} = \begin{bmatrix} 2 & -3 \\ -3 & 1 \\ 4 & -2 \end{bmatrix}$$

$$\mathbf{D} = \begin{bmatrix} 7 & -1 \\ 5 & 2 \\ 1 & -4 \end{bmatrix}$$

(a)  $\mathbf{C} - 3\mathbf{D}$

(b)  $\mathbf{BC}$

6. Given the four matrices in Problem 1 above, determine which of the following operations are NOT defined (circle your choices):

$\mathbf{A} + \mathbf{B}$

$\mathbf{B} - \mathbf{D}$

$\mathbf{AB}$

$\mathbf{BA}$

$\mathbf{CD}$

$\mathbf{A}^2$

$\mathbf{B}^2$

7. Set up the partial fraction decomposition for  $\frac{x+4}{x^3(x^2+x+1)^2}$ . Do NOT solve!

8. Solve the system of equations algebraically. Write your solution set as ordered pairs.

$$\begin{cases} x^2 + y = 9 \\ x - y + 3 = 0 \end{cases}$$

9. Use Gaussian Elimination to write the system of equations in row-echelon form, and then solve the system by back-substitution.

$$\begin{cases} x - 2y + 3z = 1 \\ x + 2y - z = 13 \\ 3x + 2y - 5z = 3 \end{cases}$$

**EXAM 4 (Graphing Calculator)**

---

*INSTRUCTIONS: Solve each problem in the space provided. You must show **any** and **all** work for credit. Partial credit will be given based upon how you approached each problem; answers unsupported by work will not be considered. Leave answers in exact, simplified form; do not give approximate answers unless otherwise directed. Circle your final answer for each problem.*

---

10. Solve the system of equations graphically. Indicate the functions that you graphed. Write your solution set as ordered pairs and approximate values to two decimal places.

$$\begin{cases} x^2 + y^2 = 5 \\ xy = 1 \end{cases}$$

Y1 =

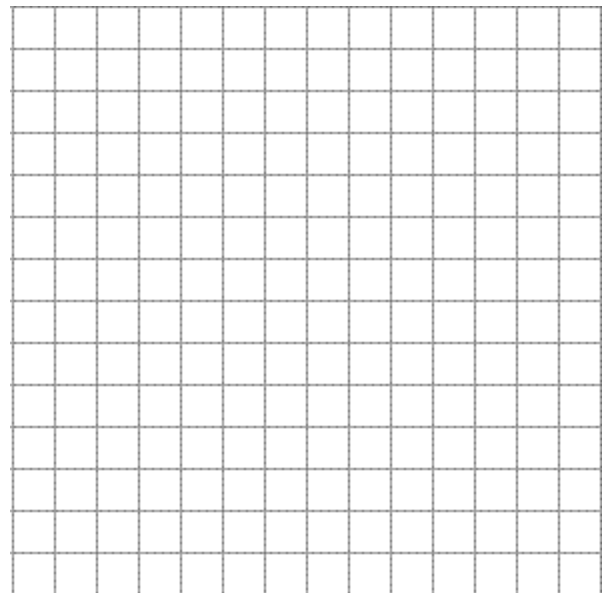
Y2 =

Y3 =

Y4 =

11. Graph the solution set to the system of inequalities and label any vertices. Show the scale on your axes. Make sure your graph is accurate and your solution set is very clear!

$$\begin{cases} x^2 + y \leq 9 \\ x - y < -3 \\ y \geq 0 \end{cases}$$



6. Use Gauss-Jordan reduction to write the augmented matrix for the system in *reduced row-echelon form*. Show each step of the process, and use only one elementary row operation per step. Then write the solution set for the system. **NO CREDIT UNLESS FULL STEPS ARE SHOWN!!**

$$\begin{cases} 2x - 3y = -7 \\ 3x + y = -5 \end{cases}$$

7. Use your calculator to write the system of equations in reduced row-echelon form (you must write the equations, not just the matrix). Then give the general solution set and a particular solution.

$$\begin{cases} x + 3y - 2z = 0 \\ x + \quad 2z = 2 \\ 2x + 3y \quad = 2 \end{cases}$$

8. Find the partial fraction decomposition for  $\frac{x^3 - 4x - 10}{x^2 - x - 6}$ .