

1. Which of the following is a *linear equation* of variables x_1 and x_2 ? (Circle one).

- A. $3x_1x_2 = 7$
- B. $3(x_1)^2 + 2(x_2)^2 = 6$
- C. $3x_1 + 2x_2$
- D. $3\sqrt{x_1} + 2\sqrt{x_2} = 6$
- E. $3x_1 + 2x_2 = 6$

2. Using any method find the solution set to the system of linear equations:

$$3x_1 + x_2 = 1$$

$$x_1 - 2x_2 = 2$$

3. Write the augmented matrix for the system of linear equations:

$$x_1 + x_2 + 3x_3 = 2$$

$$x_1 + 4x_2 + 4x_3 = 2$$

$$4x_1 - 3x_2 - 5x_3 = -3$$

4. Solve (if possible) the following linear system and state if it is consistent or inconsistent:

$$\begin{array}{ccccccccc} x_1 & + & 3x_2 & + & 2x_3 & + & 9x_4 & = & 1 \\ x_1 & + & 2x_2 & - & x_3 & + & x_4 & = & 4 \\ -x_1 & - & 2x_2 & + & x_3 & - & x_4 & = & 2 \end{array}$$

5. Write down an augmented matrix in RREF form that corresponds to a linear system with 2 leading variables and 3 free variables.

6. Determine whether the statements below are true or false.

- 1. If the RREF of an augmented matrix corresponding to a linear system has a row of zeros, then the system must have infinitely many solutions.
- 2. A linear system can have exactly 1 solution.
- 3. A linear system can have exactly 5 solutions.
- 4. A linear system with infinitely many solutions must be a homogeneous linear system.
- 5. A homogeneous linear system always has at least one solution.