

Pre-calculus 9.1 Homework

Name _____ period _____ date _____

Write the system of equations corresponding to each augmented matrix. Then perform the indicated row operation(s) on the given augmented matrix.

1. $\left[\begin{array}{cc|c} 1 & -3 & -2 \\ 2 & -5 & 5 \end{array} \right] R_2 = -2r_1 + r_2$

2. $\left[\begin{array}{ccc|c} 5 & -3 & 1 & -2 \\ 2 & -5 & 6 & -2 \\ -4 & 1 & 4 & 6 \end{array} \right] \begin{array}{l} R_1 = -2r_2 + r_1 \\ R_3 = 2r_2 + r_3 \end{array}$

For each augmented matrix, do the following:

- 1. Write the system of equations that corresponds to the given matrix.**
- 2. State whether the system is consistent or inconsistent.**
- 3. If the system is consistent, state whether it has one solution or an infinite number of solutions.**
- 4. Give the solution (as an ordered pair, triple, or quadruplet if there's just one) or solution set (if there's no solution or an infinite number of solutions).**

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

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

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

6. $\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & -3 & 6 \\ 0 & 0 & 1 & 5 & 8 \end{array} \right]$

7. $\left[\begin{array}{cccc|c} 1 & 0 & 0 & 1 & -2 \\ 0 & 1 & 0 & 2 & 2 \\ 0 & 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{array} \right]$

8. $\left[\begin{array}{cccc|c} 1 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 & 2 \\ 0 & 0 & 1 & 0 & 3 \\ 0 & 0 & 0 & 1 & 0 \end{array} \right]$

Solve each system of equations using row operations. If the system has no solution, say that it is inconsistent.

$$9. \begin{cases} x + y = 8 \\ x - y = 4 \end{cases}$$

$$10. \begin{cases} 2x - 4y = -2 \\ 3x + 2y = 3 \end{cases}$$

$$11. \begin{cases} x + 2y = 4 \\ 2x + 4y = 8 \end{cases}$$

$$12. \begin{cases} 3x - 5y = 3 \\ 15x + 5y = 21 \end{cases}$$

$$13. \begin{cases} x - y = 6 \\ 2x - 3z = 16 \\ 2y + z = 4 \end{cases}$$

$$14. \begin{cases} x - 2y + 3z = 7 \\ 2x + y + z = 4 \\ -3x + 2y - 2z = -10 \end{cases}$$

$$15. \begin{cases} 2x - 2y - 2z = 2 \\ 2x + 3y + z = 2 \\ 3x + 2y = 0 \end{cases}$$

$$16. \begin{cases} -x + y + z = -1 \\ -x + 2y - 3z = -4 \\ 3x - 2y - 7z = 0 \end{cases}$$

$$17. \begin{cases} x + y + z + w = 4 \\ -x + 2y + z = 0 \\ 2x + 3y + z - w = 6 \\ -2x + y - 2z + 2w = -1 \end{cases}$$

EXTRA CREDIT

Solve each problem.

18. To finish manufacturing an automobile requires painting, drying, and polishing. Epsilon Motor Company produces three types of cars: the Delta, the Beta, and the Sigma. Each Delta requires 10 hours for painting, 3 hours for drying, and 2 hours for polishing. A Beta requires 16 hours for painting, 5 hours for drying, and 3 hours for polishing, and a Sigma requires 8 hours for painting, 2 hours for drying, and 1 hour for polishing. If the company has 240 hours for painting, 69 hours for drying, and 41 hours for polishing per month, how many of each type of car can they finish?

19. An application of Kirchhoff's Rules to a circuit shown results in the following system of

$$\text{equations: } \begin{cases} -4 + 8 - 2I_2 = 0 \\ 8 = 5I_4 + I_1 \\ 4 = 3I_3 + I_1 \\ I_3 + I_4 = I_1 \end{cases}$$

Find the currents I_1 , I_2 , I_3 , and I_4 .