

Math 104

Test 4 - sample questions

You may use your own book, notes, and calculator. Calculator swaps are not allowed. Show work where required.

1) Give the coordinates of the point of intersection of the linear equations. **Show work!**

$$\begin{aligned} 3x + y &= 5 \\ x + 2y &= 6 \end{aligned}$$

$$\begin{aligned} x &= \underline{\hspace{2cm}} \\ y &= \underline{\hspace{2cm}} \end{aligned}$$

2) Does the system have a unique solution, no solution, or many solutions?

$$\begin{aligned} 4x - 8y + 3z &= 24 \\ -x + 2y - 2z &= -5 \\ 2x - 4y - z &= 14 \end{aligned}$$

- A) Many solutions B) A unique solution C) No solution

3) There were 20,000 people at a ballgame in Atlanta. They paid either \$12 for reserved seats or \$8 for general admission. The day's receipts were \$182,000. How many people paid for reserved seats and how many for general admission? **Show work!**

$$\begin{aligned} \text{Reserved: } &\underline{\hspace{2cm}} \\ \text{General: } &\underline{\hspace{2cm}} \end{aligned}$$

4) Write the augmented matrix associated with the system.

$$\begin{aligned} -x \quad \quad + 7z &= 6 \\ \quad \quad 2y + 3z &= 7 \\ 5x + 4y + 8z &= 5 \end{aligned}$$

5) The matrix below is the augmented matrix associated with a system of linear equations in x, y, and z. Find the solution to the system.

$$\begin{array}{ccc|c} 1 & 3 & -1 & -2 \\ 4 & 1 & 0 & 4 \\ 1 & 1 & 5 & 16 \end{array}$$

$$x = \underline{\hspace{2cm}} \quad y = \underline{\hspace{2cm}} \quad z = \underline{\hspace{2cm}}$$

6) A bakery sells three types of cakes. The table below gives the number of cups of flour, cups of sugar, and eggs needed to produce each type of cake.

	Cake I	Cake II	Cake III
flour	2	4	2
sugar	2	1	2
eggs	2	1	3

To fill its orders for cakes, the bakery used 72 cups of flour, 48 cups of sugar, and 57 eggs. How many cakes of each type were made? **Show the matrix equation that you are solving!**

$$\begin{aligned} \text{Cake I: } &\underline{\hspace{2cm}} \\ \text{Cake II: } &\underline{\hspace{2cm}} \\ \text{Cake III: } &\underline{\hspace{2cm}} \end{aligned}$$

7) Find the inverse matrix of A.

$$A := \begin{pmatrix} 1 & 1 & 1 \\ 2 & 1 & 1 \\ 2 & 3 & 2 \end{pmatrix}$$

8) If $A^{-1} = \begin{pmatrix} -1 & 2 & 1 \\ 11 & 2 & -3 \\ -3 & -2 & 3 \end{pmatrix}$, then solve $A \cdot \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 1 \\ 8 \\ 2 \end{pmatrix}$ for $\begin{pmatrix} x \\ y \\ z \end{pmatrix}$

$$x = \underline{\hspace{2cm}} \quad y = \underline{\hspace{2cm}} \quad z = \underline{\hspace{2cm}}$$

Explain what you did to find the solution.