

Please answer all questions and show all work questions 6 - 14 on a separate sheet of paper.

- 1) What are the dimensions of $\begin{bmatrix} 1 & 5 & 0 & -1 \\ 6 & -2 & 8 & -4 \end{bmatrix}$?
- A) 4×4 B) 2×4 C) 2×2 D) 4×2
- 2) If the augmented matrix for a system is $\begin{bmatrix} 2 & 1 & 3 \\ 3 & 2 & 1 \end{bmatrix}$, what is the system of equations?
- A) $2x + y = 3$ and $3x + 2y = 1$ C) $2x - y = 3$ and $3x - 2y = 1$
B) $2x + 3y = 1$ and $3x + y = 2$ D) $3x + y = 3$ and $x + 2y = 1$
- 3) If the augmented matrix for a system is $\begin{bmatrix} 1 & 0 & 3 \\ 0 & 2 & 4 \end{bmatrix}$, what is the solution?
- A) $\{(0,2)\}$ B) $\{(1,2)\}$ C) $\{(3,2)\}$ D) $\{(3,4)\}$
- 4) Name the following matrix by its dimensions:

$$M = \begin{bmatrix} 3 & 1 \\ 1 & 3 \\ 5 & 7 \end{bmatrix}$$

- 5) Write a matrix B of order 2×3 whose elements are $b_{11} = 2$, $b_{12} = 3$, $b_{13} = 4$, $b_{21} = -3$, $b_{22} = -4$, and $b_{23} = 5$.

- 6) Solve the system of linear equations for all variables:

$$\begin{aligned} 2x - y + z &= 6 \\ -x + 2y + z &= 0 \\ x + y - z &= -3 \end{aligned}$$

- 7) Solve the following system of equations using elimination (NOT MATRICES)

$$\begin{aligned} x + 3y + z &= 3 \\ x + 5y + 5z &= 1 \\ 2x + 6y + 3z &= 8 \end{aligned}$$

8. Solve the following system of equations using MATRICES.

$$x - 3z = -2$$

$$3x + y - 2z = 5$$

$$2x + 2y + z = 4$$

9. Solve the following system of linear equations for all variables.

$$x - 2y + 3z = 9$$

$$-x + 3y = -4$$

$$2x - 5y + 5z = 17$$

10. Solve the following systems of equations algebraically:

a. $7x - 2y = 14$
 $-3y + 7x = 21$

b. $-4x + 5y - 14 = 0$
 $8 + 4x = 3y$

c. $93 - a = 4b$
 $a + 4b = 43$

d. $8x + 12y = 48$
 $6x + 9y = 36$

e. $4x - 5y = -6$
 $-3y - 2 = -x$

$$x - 2y + z = 7$$

11. Given: $3x + y - z = 2$

$$2x + 3y + 2z = 7$$

(a) Write the augmented matrix. Label it G .

(b) Using G add $-3R_1$ to R_2 . Label the new matrix as H .

(c) Using H multiply R_1 by -2 and add it to R_3 . Label the new matrix as J .

(d) Using J , multiply R_2 by -1 and add it to R_3 . Label the new matrix as K .

(e) Using K , add R_3 to R_2 . Label the New matrix L .

(f) Using L , multiply R_2 by $\frac{1}{7}$. Label the new matrix P .

(g) Using P , multiply R_3 by $\frac{1}{4}$. Label the new matrix Q .

(h) What is the solution for the system?

12. Solve the following equations algebraically for all values of x . Be sure to indicate any restrictions.

a.
$$\frac{x}{x-2} - \frac{8}{x+3} = \frac{10}{x^2 + x - 6}$$

b.
$$\frac{9}{x} + \frac{9}{x-2} = 12$$

c.
$$\frac{4}{x-1} = \frac{5}{2x-2} + \frac{3x}{4}$$

d.
$$\frac{1}{2a} - \frac{9}{a^2 + 6a} = \frac{2-a}{2a+12}$$

13. Solve each of the following graphically by:

- i. Draw a complete graph of the function showing all intercepts and asymptotes
- ii. Write the window settings you use on your graph
- iii. Find the solution set

a.
$$\frac{x-2}{x} = \frac{x+2}{2x}$$

b.
$$\frac{x}{x+2} = \frac{3}{x} + \frac{4}{x^2+2x}$$

c.
$$\frac{x}{2} = \frac{3}{2x+1}$$

14. Solve each of the following graphically by:

- i. Draw a complete graph of the inequality showing all intercepts and asymptotes
- ii. Write the window settings you use on your graph
- iii. Draw a number line with critical points that show the values of x that satisfy the inequality
- iv. State the solution set using both set builder and interval notation

a.
$$\frac{x-1}{4} \geq \frac{8}{x+3}$$

b.
$$\frac{x-3}{x+2} < 8$$

c.
$$\frac{3}{x+1} + \frac{2}{x} < 6$$