

Name: \_\_\_\_\_

**Instructions:** Answer the questions in the spaces provided on the question sheets. If you need more space, use the bottom of the last page. Partial credit will be awarded. Scientific calculators are allowed, but graphing calculators, smartphones and computers are not allowed. This exam is closed book and closed notes.

1. [5 points] Solve the linear inequality *and graph the solution set* on a number line.

$$-2x + 1 \leq 5$$

2. [10 points] Solve the following linear inequality in two variables for  $y$ , *and graph the solution set* in the  $x$ - $y$  plane.

$$x + 2y > -2$$

3. [10 points] Write the equation of a line in *slope intercept form* that goes through the point  $(4, 0)$  and is parallel to the line  $2x + 4y = 5$ .
4. [10 points] Vans Furniture Store sells a popular rocking chair. They've discovered, through market analysis, that the demand equation is  $2p + q = 740$  for this chair, and their supply equation is  $p = 2q - 530$ . Given this information, what price should they charge for a rocking chair? How many chairs will they sell at this price?

5. Circle the best answer.

(a) [5 points] How many solutions does the following system of linear equations have?

$$\begin{aligned}x - 3y &= 2 \\ 3x - 9y &= 6\end{aligned}$$

- A. none
- B. one
- C. two
- D. infinitely many

(b) [5 points] How many solutions does the following system of linear equations have?

$$\begin{aligned}5x + y &= 0 \\ 10x + 2y &= 5\end{aligned}$$

- A. none
- B. one
- C. two
- D. infinitely many

6. [10 points] List the three elementary row operations used in Gauss–Jordan elimination.

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7. Circle the best answer.

- (a) [2 points] Matrix multiplication is commutative.  
A. true  
B. false
- (b) [2 points] Matrix multiplication is associative.  
A. true  
B. false
- (c) [2 points] A square matrix always has an inverse.  
A. true  
B. false
- (d) [2 points] A matrix can be thought of as a function.  
A. true  
B. false
- (e) [2 points] If  $A$  and  $B$  are  $2 \times 2$  matrices, and  $I$  is the  $2 \times 2$  identity matrix, then  $AIB = AB$ .  
A. always  
B. sometimes  
C. never

8. [10 points] Let  $A = \begin{bmatrix} 3 & 2 \\ 1 & 0 \end{bmatrix}$ , and let  $B = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ . Compute  $AB^T$ .

9. [10 points] Let  $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 2 \\ 1 & 0 & -1 \end{bmatrix}$ , and let  $\vec{x} = \begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix}$ . Compute  $A\vec{x}$ .

10. [15 points] Solve the following system of equations using Gauss-Jordan elimination on the augmented matrix.

$$2x + 4y + 0z = -4$$

$$6x + 0y + 3z = 12$$

$$0x + 1y + 1z = -2$$

Question	Points	Score
1	5	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	15	
Total:	100	