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Note: You will only be allowed to submit this test one time. Your score will be averaged in your overall course grade and you will not be able to submit this test again.

MA170G.06
1 of 25
Encode the following message:
Do not give up.

Break the message into groups of two letters and use the matrix.

$$M = \begin{bmatrix} 7 & 7 \\ 3 & 4 \end{bmatrix}$$

- ○ $\begin{bmatrix} 133 \\ 72 \end{bmatrix}, \begin{bmatrix} 203 \\ 102 \end{bmatrix}, \begin{bmatrix} 189 \\ 88 \end{bmatrix}, \begin{bmatrix} 217 \\ 115 \end{bmatrix}, \begin{bmatrix} 182 \\ 99 \end{bmatrix}$
- ○ $\begin{bmatrix} 119 \\ 64 \end{bmatrix}, \begin{bmatrix} 273 \\ 129 \end{bmatrix}, \begin{bmatrix} 231 \\ 119 \end{bmatrix}, \begin{bmatrix} 238 \\ 109 \end{bmatrix}, \begin{bmatrix} 217 \\ 115 \end{bmatrix}, \begin{bmatrix} 224 \\ 123 \end{bmatrix}, \begin{bmatrix} 252 \\ 123 \end{bmatrix}$
- ○ $\begin{bmatrix} 56 \\ 105 \end{bmatrix}, \begin{bmatrix} 378 \\ 98 \end{bmatrix}, \begin{bmatrix} 210 \\ 140 \end{bmatrix}, \begin{bmatrix} 378 \\ 49 \end{bmatrix}, \begin{bmatrix} 126 \\ 154 \end{bmatrix}, \begin{bmatrix} 70 \\ 189 \end{bmatrix}, \begin{bmatrix} 294 \\ 112 \end{bmatrix}$
- ○ $\begin{bmatrix} 133 \\ 72 \end{bmatrix}, \begin{bmatrix} 287 \\ 137 \end{bmatrix}, \begin{bmatrix} 245 \\ 125 \end{bmatrix}, \begin{bmatrix} 238 \\ 109 \end{bmatrix}, \begin{bmatrix} 217 \\ 115 \end{bmatrix}, \begin{bmatrix} 224 \\ 123 \end{bmatrix}, \begin{bmatrix} 259 \\ 127 \end{bmatrix}$

2 of 25
Determine whether the given ordered set of numbers is a solution of the system of equations.

(1, -3)
$x + y = -2$
$x - y = 4$
○ Yes
○ No

3 of 25
Given a system of two linear equations in two variables, if the graphs of the two equations coincide, then the system is independent.
○ True
○ False

4 of 25
Perform the indicated operation where possible.

$$\begin{bmatrix} -9 & 1 \\ 2 & 5 \end{bmatrix} + \begin{bmatrix} 6 & 2 \\ 3 & -1 \end{bmatrix}$$

○ $\begin{bmatrix} 9 \end{bmatrix}$

- $\begin{bmatrix} -3 & -7 \\ -6 & -10 \end{bmatrix}$
- $\begin{bmatrix} -3 & 3 \\ 5 & 4 \end{bmatrix}$
- $\begin{bmatrix} 3 & 4 \\ 0 & 4 \end{bmatrix}$

5 of 25
Find the value(s) of the function, subject to the system of inequalities.

Find the minimum of $P = 23x + 21y + 22$ subject to:

$x \geq 0, y \geq 0, x + y \geq 1.$

- 66
- 43
- 45
- 22

6 of 25
Perform the indicated operation.

Let $C = \begin{bmatrix} 1 \\ -3 \\ 2 \end{bmatrix}$ and $D = \begin{bmatrix} -1 \\ 3 \\ -2 \end{bmatrix}$

Find C - 2D.

- $\begin{bmatrix} 3 \\ -9 \\ 6 \end{bmatrix}$
- $\begin{bmatrix} -1 \\ 3 \\ -2 \end{bmatrix}$
- $\begin{bmatrix} -3 \\ 9 \\ -6 \end{bmatrix}$
- $\begin{bmatrix} 3 \\ -6 \\ 4 \end{bmatrix}$

7 of 25
Determine whether the two matrices are inverses of each other by computing their product.

$\begin{bmatrix} 2 & -1 & 0 \\ -1 & 1 & -2 \\ 1 & 0 & -1 \end{bmatrix}, \begin{bmatrix} 1 & -1 & 2 \\ -3 & -2 & 4 \\ -1 & 1 & 1 \end{bmatrix}$

- No
- Yes

8 of 25
Find the inverse, if it exists, of the given matrix

$$\begin{bmatrix} 2 & -1 & 0 \\ 3 & -2 & 0 \\ -2 & 3 & 1 \end{bmatrix}$$

- $\begin{bmatrix} 2 & -1 & 0 \\ 3 & -2 & 0 \\ -5 & 4 & -1 \end{bmatrix}$
- $\begin{bmatrix} 1 & -1 & 0 \\ 3 & -2 & 1 \\ -5 & 4 & -1 \end{bmatrix}$
- $\begin{bmatrix} 2 & -1 & 0 \\ 3 & 2 & 0 \\ -5 & 4 & 1 \end{bmatrix}$
- $\begin{bmatrix} 2 & -1 & 0 \\ 3 & -2 & 0 \\ -5 & 4 & 1 \end{bmatrix}$

9 of 25
Solve the system of equations. If the system is dependent, express solutions in terms of the parameter z.

$-2x + y + 4z = 10$
$-7x + 4y - 3z = 7$

- (19z - 33, 34z - 56, z)
- (33 - 43z, 56 - 34z, z)
- (-33 + 43z, 10 - 2x + 4z, z)
- (-33 + 43z, 10 + 2x - 4z, z)

10 of 25
Solve the matrix equation for X.

$A = \begin{bmatrix} 2 & 0 & 0 \\ -1 & 2 & 0 \\ -2 & 4 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 4 \\ 10 \\ 11 \end{bmatrix}$, $AX = B$

- $\begin{bmatrix} 0 \\ 8 \\ -9 \end{bmatrix}$
- $\begin{bmatrix} 2 \\ 6 \\ -9 \end{bmatrix}$
- $\begin{bmatrix} 3 \\ 7 \\ -8 \end{bmatrix}$
- $\begin{bmatrix} 3 \\ 6 \\ -10 \end{bmatrix}$

11 of 25
A bakery sells three types of cakes. Cake I requires 2 cups of flour, 2 cups of sugar, and 2 eggs. Cake II requires 4 cups of flour, 1 cup of sugar, and 1 egg. Cake III requires 2 cups of flour, 2 cups of sugar, and 3 eggs. Make a 3 x 3 matrix showing the required ingredients for each cake. Assign the cakes to the rows and the ingredients to the columns.

- $\begin{bmatrix} 2 & 1 & 3 \\ 2 & 1 & 2 \\ 2 & 4 & 2 \end{bmatrix}$
- $\begin{bmatrix} 2 & 2 & 3 \\ 4 & 1 & 1 \\ 2 & 2 & 2 \end{bmatrix}$
- $\begin{bmatrix} 2 & 4 & 2 \\ 2 & 1 & 2 \\ 2 & 1 & 3 \end{bmatrix}$
- $\begin{bmatrix} 2 & 2 & 2 \\ 4 & 1 & 1 \\ 2 & 2 & 3 \end{bmatrix}$

12 of 25
Solve the matrix equation for X.

$A = \begin{bmatrix} 2 & 2 & 0 \\ -4 & -3 & 2 \\ 0 & -3 & -5 \end{bmatrix}$, $B = \begin{bmatrix} -10 \\ 2 \\ -9 \end{bmatrix}$, $AX = B$

- $\begin{bmatrix} -113 \\ 108 \\ -63 \end{bmatrix}$
- $\begin{bmatrix} -113 \\ 108 \\ -65 \end{bmatrix}$
- $\begin{bmatrix} -118 \\ 109 \\ -63 \end{bmatrix}$
- $\begin{bmatrix} -113 \\ 107 \\ -62 \end{bmatrix}$

13 of 25
Factories A and B sent rice to stores 1 and 2. A sent 10 loads and B sent 22. Store 1 used 15 loads and store 2 used 17. It cost \$200 to ship from A to 1, \$350 from A to 2, \$300 from B to 1, and \$250 from B to 2. \$ 7750 was spent. How many loads went where?

- 10 from A to 1
  0 from A to 2
  5 from B to 1
  17 from B to 2
- 0 from A to 1
  10 from A to 2
  17 from B to 1

5 from B to 2
◌ 9 from A to 1
1 from A to 2
6 from B to 1
4 from Y to B
◌ 8 from A to 1
2 from A to 2
7 from B to 1
15 from B to 2

14 of 25
Use x for the number of chairs and y for the number of tables made per week. The number of work-hours available for construction and finishing is fixed.

	Hours per chair	Hours per table	Total hours available
Construction	3	5	45
Finishing	3	3	30

◌
$5x + 3y \leq 45$
$3x + 3y \leq 30$
$x \geq 0$
$y \geq 0$
◌
$3x + 5y \leq 45$
$3x + 3y \leq 30$
$x \geq 0$
$y \geq 0$
◌
$3x + 5y \leq 45$
$3x + 3y \leq 30$

$x \leq 0$

$y \leq 0$

○

$5x + 3y \leq 30$

$3x + 3y \leq 45$

$x \geq 0$

$y \geq 0$

15 of 25
Find the value(s) of the function, subject to the system of inequalities.

Find the maximum and minimum of $P = 10x - 16y$ subject to:

$0 \leq x \leq 5$, $0 \leq y \leq 8$, $4x + 5y \leq 30$, and $4x + 3y \leq 20$

○ 50, 0
○ -96, 0
○ -67.5, -96
○ 50, -96

16 of 25
The Acme Class Ring Company designs and sells two types of rings: the VIP and the SST. They can produce up to 24 rings each day using up to 60 total man-hours of labor. It takes 3 man-hours to make one VIP ring, versus 2 man-hours to make one SST ring.

How many of each type of ring should be made daily to maximize the company's profit, if the profit on a VIP ring is $60 and on an SST ring is $20?
○ 24 VIP and 4 SST
○ 20 VIP and 0 SST
○ 20 VIP and 4 SST
○ 24 VIP and 0 SST

17 of 25
A manufacturer of wooden chairs and tables must decide in advance how many of each item will be made in a given week. Use the table to find the system of inequalities that describes the manufacturer's weekly production.

Use x for the number of chairs and y for the number of tables made per week. The number of work-hours available for construction and finishing is fixed.

	Hours per chair	Hours per table	Total hours available
Construction	3	4	36
Finishing	2	2	20

○

$3x + 4y \leq 36$

$2x + 2y \leq 20$

$x \geq 0$

$y \geq 0$

○

$3x + 2y \leq 36$

$2x + 4y \leq 20$

○

$3x + 2y \leq 56$

$2x + 4y \leq 56$

○

$3x + 4y \leq 56$

$2x + 2y \leq 56$

$x \geq 0$

$y \geq 0$

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Use the Gauss-Jordan method to solve the system of equations.

$2x - 5y + z = 11$
$3x + y - 6z = 1$
$5x - 4y - 5z = 12$

○

$\left(\frac{-29z + 16}{17}, \frac{15z - 31}{17}, z\right)$

○

$\left(\frac{29z + 16}{17}, \frac{15z + 31}{17}, z\right)$

○

$\left(\frac{29z + 16}{17}, \frac{15z - 31}{17}, z\right)$

○

$\frac{29z - 16}{}$ $\frac{15z - 31}{}$

$\left(\sqrt{17}, \sqrt{17}, z\right)$

19 of 25
Barnes and Able sell life, health, and auto insurance. Sales for May and June are given in the matrices.

$$M = \begin{bmatrix} 20{,}000 & 15{,}000 & 8000 \\ 30{,}000 & 0 & 17{,}000 \end{bmatrix}$$

$$J = \begin{bmatrix} 70{,}000 & 0 & 30{,}000 \\ 20{,}000 & 25{,}000 & 32{,}000 \end{bmatrix}$$

Find the matrix that would give total sales for the months of May and June.

$$\begin{bmatrix} 90{,}000 & 15{,}000 & 38{,}000 \\ 50{,}000 & 25{,}000 & 49{,}000 \end{bmatrix}$$

$$\begin{bmatrix} 90{,}000 & 15{,}000 & 38{,}000 \\ 50{,}000 & 25{,}000 & 32{,}000 \end{bmatrix}$$

$$\begin{bmatrix} 90{,}000 & 0 & 38{,}000 \\ 50{,}000 & 0 & 49{,}000 \end{bmatrix}$$

$$\begin{bmatrix} 140{,}000 & 40{,}000 & 87{,}000 \end{bmatrix}$$

20 of 25
Use the Gauss-Jordan method to solve the system of equations.

$x + y + z = 7$

$x - y + 2z = 7$
$2x + 3z = 14$

○ $\left(\frac{3z + 14}{2}, \frac{z}{2}, z\right)$

○ $\left(\frac{-3z - 14}{2}, \frac{z}{2}, z\right)$

○ $\left(\frac{-3z + 14}{2}, \frac{z}{2}, z\right)$

○ $\left(\frac{-3z + 14}{2}, 2z, z\right)$

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Use the Gauss-Jordan method to solve the system of equations.

$4x - 6y = 54$
$20x - 30y = 270$

○ (9, -3)

○ $\left(\frac{27}{2} - \frac{3}{2}y, y\right)$

○ $\left(\frac{27}{2} + \frac{3}{2}y, y\right)$

○ No Solution

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What is the size of the matrix?

$\begin{bmatrix} 2 & 9 \\ -5 & 5 \end{bmatrix}$

○ 2
○ 4
○ 2 x 2
○ 1

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The Acme Class Ring Company designs and sells two types of rings: the VIP and the SST. They can produce up to 24 rings each day using up to 60 total man-hours of labor. It takes 3 man-hours to make one VIP ring, versus 2 man-hours to make one SST ring.

How many of each type of ring should be made daily to maximize the company's profit, if the profit on a VIP ring is $40 and on an SST ring is $35?

- 14 VIP and 10 SST
- 18 VIP and 6 SST
- 16 VIP and 8 SST
- 12 VIP and 12 SST

24 of 25

Perform row operations on the augmented matrix as far as necessary to determine whether the system is independent, dependent, or inconsistent.

$x + y + z = 11$
$x - y + 3z = 5$
$2x + 2y + 2z = 15$

- Inconsistent
- Dependent
- Independent

25 of 25

Find the order of the matrix product AB and the product BA, whenever the products exist.

A is 2 x 1, B is 1 x 1

- AB is 2 x 1, BA is nonexistent.
- AB is nonexistent, BA is 1 x 2.
- AB is 1 x 2, BA is 1 x 1.
- AB is 2 x 2, BA is 1 x 1.

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