[1A] Find the y-intercept of the line $3x + y = 4$:
(a) 1.
(b) 2.
(c) 3.
(d) 4.
(e) None of the above.

************

[2A] Find the point of intersection of the lines:

\[ 2x - 3y = -8 \quad \text{and} \quad 4x - y = 2 \]

(a) \( \left( \frac{7}{5}, \frac{-18}{5} \right) \).
(b) \( \left( \frac{7}{5}, \frac{18}{5} \right) \).
(c) \( \left( \frac{1}{5}, \frac{14}{5} \right) \).
(d) \( (-4, 0) \).
(e) None of the above.

************

[3A] Given:

\[
\begin{bmatrix}
1 & 0 & -2 & -2 \\
0 & 1 & 0 & -5 \\
-4 & 0 & 9 & 9 \\
0 & 2 & 1 & -8
\end{bmatrix}
= \begin{bmatrix}
9 & 0 & 2 & 0 \\
-20 & -9 & -5 & 5 \\
8 & 2 & 2 & -1 \\
-4 & -2 & -1 & 1
\end{bmatrix}
\]

solve

\[
\begin{align*}
w - 2y - 2z &= 4 \\
x - 5z &= 3 \\
-4w + 9y + 9z &= 2 \\
2x + y - 8z &= 1
\end{align*}
\]

In the solution:
(a) \( z = -23 \)
(b) \( z = -15 \)
(c) \( z = -17 \)
(d) \( z = -19 \)
(e) None of the above.
[4A] Consider the inverse (if it exists) of:

\[
\begin{bmatrix}
2 & 1 & 1 \\
1 & 1 & 1 \\
3 & 2 & -2
\end{bmatrix}
\]

(a) The entry in the second row and third column is 0.
(b) The entry in the third row and third column is 1/4.
(c) The entry in the third row and third column is -1/4.
(d) The entry in the third row and third column is 1.
(e) The matrix is not invertible.

************

[5A] Let

\[
A = \begin{bmatrix}
1 & 2 & 3 & -1 \\
7 & 0 & -2 & 4
\end{bmatrix}
\quad \text{and} \quad
B = \begin{bmatrix}
0 & 2 \\
1 & -1 \\
3 & 4 \\
-2 & 0
\end{bmatrix}
\]

If possible, find the entry in the first row and second column of \(AB\).

(a) -14
(b) 6
(c) 12
(d) 13
(e) The product is undefined.

************

[6A] Which of the following matrices are invertible?

\[
A = \begin{bmatrix}
8 & -2 \\
-16 & 4
\end{bmatrix}, \quad
B = \begin{bmatrix}
0 & 5 \\
-1 & 0
\end{bmatrix}, \quad
C = \begin{bmatrix}
0 & 2 \\
0 & 4
\end{bmatrix}, \quad
D = \begin{bmatrix}
8 & 4 \\
-16 & 8
\end{bmatrix}
\]

(a) A only.
(b) A and B only.
(c) A,B,C and D.
(d) B and D only.
(e) Some other selection.
[7A] Solve the system:

\[
\begin{align*}
2x + y + 2z &= 0 \\
3y + 6z &= -18 \\
y + 2z &= 4
\end{align*}
\]

In the solution:
(a) \( x = 2 \).
(b) \( x \) = any value.
(c) \( x = -7 \).
(d) No solution.
(e) None of the above.

************

[8A] Determine the value of \( k \) so that the following system has infinitely many solutions.

\[
\begin{align*}
4x + 2y &= 5 \\
12x + ky &= 15
\end{align*}
\]

(a) -10
(b) 6
(c) 0
(d) -6
(e) None of the above.

************

[9A] If \( A \) is a \( 5 \times 2 \) matrix and the matrix product \( ACC \) is defined, what is the size of \( C \)?
(a) \( 2 \times 2 \).
(b) \( 5 \times 2 \).
(c) \( 5 \times 5 \).
(d) \( 2 \times 5 \).
(e) None of the above.
[10A] Suppose that you performed Gauss-Jordan elimination to solve a system of equations with variables $x, y$ and $z$. You ended up with the augmented matrix:

$$
\begin{bmatrix}
1 & 0 & 0 & 6 \\
0 & 1 & 0 & -4 \\
0 & 0 & 0 & 0
\end{bmatrix}
$$

Which of the following statements is true?
(a) There are no solutions to the system.
(b) The general solution is:

$$
x = -6 \\
y = 4 \\
z = \text{any value}
$$

(c) A specific (particular) solution is

$$
x = 6 \\
y = -4 \\
z = 0
$$

(d) A specific (particular) solution is

$$
x = 6 \\
y = 4 \\
z = 5
$$

(e) None of the above.

************

[11A] Which statements are true?
[I] A non-square matrix never has an inverse.
[II] If $A$ is a matrix then $A+A$ always exists..
[III] If $A$ is a matrix and $c$ a scalar then $cA$ always exists.
[IV] If $A$ and $B$ are matrices then $A-B$ always exists.
(a) I, II and III only.
(b) III and IV only.
(c) III only.
(d) II and III only.
(e) Some other selection.

************

[12A] Let

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

Compute the top right entry of $AB - BA$

(a) 4.
(b) 3.
(c) 2.
(d) 1.
(e) 0.
Let

\[ A = \begin{bmatrix} 3 & 5 & 1 \\ -2 & -4 & 2 \end{bmatrix}, \quad B = \begin{bmatrix} 0 & -2 & -4 \\ -3 & 1 & -5 \end{bmatrix} \]

Which of the following statements about \((A - 2B)\) are true?

[I] Its size is 2x3.

[II] The entry in the first row, first column is 3.

[III] The entry in the first row, second column is 1.

(a) I only.

(b) I and II only.

(c) III only.

(d) II only.

(e) II and III only.

Which of the following systems have no solutions?

I. \[ \begin{align*}
  x + 2y - 4z &= 10 \\
  y + z &= -6 
\end{align*} \]

II. \[ \begin{align*}
  x + 2y - 4z &= 10 \\
  y + z &= -6 \\
  -y - z &= -6 
\end{align*} \]

III. \[ \begin{align*}
  x + 2y - 4z &= 10 \\
  y + z &= -6 \\
  w &= 8 
\end{align*} \]

(a) I only.

(b) I and II only.

(c) II only.

(d) III only.

(e) Some other selection.

Section 2.7 Omitted.