(1) Find the distance between the points (1, 3) and (4, 5).
(a) 4       (b) 5       (c) $\sqrt{10}$       (d) $\sqrt{13}$       (e) NOTA

(2) True or False? Consider the following two statements:

I. If the slope of line $\ell$ equals the slope of line $m$, then $\ell$ and $m$ are parallel.
II. If the distance needed to stop a car going 30 mph is 100 feet, then the distance needed to stop the same car going 60 mph is 400 feet.

(a) both I and II are true
(b) I is true, II is false
(c) I is false, II is true
(d) both I and II are false

(3) What are the intercepts of the line $6x - 10y = 30$?
(a) (6, 0) and (0, 10)
(b) (5, 0) and (0, 3)
(c) (6, 0) and (0, -10)
(d) (5, 0) and (0, -3)
(e) NOTA
(4) Brenda decides to sell the peaches from her backyard to the women in the neighborhood. She sells Mrs. Jones 10 large peaches and 15 small peaches for $9.50. She sells Mrs. Smith 8 large peaches and 5 small peaches for $5.50. If \( L \) is the price of a large peach and \( S \) is the price of a small peach, which of the following equations should you use to find the values of \( L \) and \( P \):

\[
\begin{align*}
(a) & \quad \begin{cases} 10L + 15S = 9.5 \\ 8L + 5S = 5.5 \end{cases} & (d) & \quad \begin{cases} 5L + 8S = 9.5 \\ 8L + 15S = 5.5 \end{cases} \\
(b) & \quad \begin{cases} 15L + 10S = 9.5 \\ 5L + 8S = 5.5 \end{cases} & (e) & \text{NOTA} \\
(c) & \quad \begin{cases} 8L + 5S = 9.5 \\ 15L + 8S = 5.5 \end{cases}
\end{align*}
\]

(5) If \( x \) and \( y \) satisfy the equations

\[
\begin{cases} 2x - 7y = 1 \\ 3x + y = -1 \end{cases}
\]

what is the value of \( y \)?

\[
\begin{align*}
(a) & \quad \frac{5}{23} & (b) & \quad -\frac{5}{23} & (c) & \quad \frac{1}{19} & (d) & \quad -\frac{1}{19} & (e) & \text{NOTA}
\end{align*}
\]

(6) If you pivot on the entry \( \frac{10}{3} \) in row 2, column 2 of the matrix

\[
\begin{bmatrix}
1 & -\frac{1}{3} & \frac{1}{3} & \frac{1}{3} \\
0 & \frac{10}{3} & \frac{1}{3} & \frac{11}{3} \\
0 & \frac{5}{3} & -\frac{1}{3} & \frac{4}{3}
\end{bmatrix}
\]

what will be the third row of the resulting matrix?

\[
\begin{align*}
(a) & \quad 0 \quad 0 \quad -1 \quad -\frac{1}{2} \\
(b) & \quad 0 \quad 0 \quad \frac{1}{3} \quad \frac{19}{6} \\
(c) & \quad 0 \quad 0 \quad \frac{1}{3} \quad \frac{6}{5} \\
(d) & \quad 0 \quad 0 \quad 0 \quad \frac{16}{3} \\
(e) & \text{NOTA}
\end{align*}
\]
(7) If \( t \neq 0 \), what is the inverse of the matrix \[
\begin{bmatrix}
t & t \\ 0 & t
\end{bmatrix}
\]?

(a) \( \frac{1}{t} \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix} \)

(b) \( \frac{1}{t^2} \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix} \)

(c) \( \frac{1}{t} \begin{bmatrix} 1 & 0 \\ -1 & 1 \end{bmatrix} \)

(d) \( \frac{1}{t^2} \begin{bmatrix} 1 & 0 \\ -1 & 1 \end{bmatrix} \)

(e) NOTA

(8) If \( A \) has dimension \( 3 \times 7 \), \( B \) has dimension \( 5 \times 5 \), \( C \) has dimension \( 7 \times 9 \), and \( D \) has dimension \( 9 \times 5 \), which of the following matrices are defined?

(i) \( ACDB \)  
(ii) \( CDBB \)  
(iii) \( DBAC \)

(a) (i), (ii), and (iii)  
(b) (i) and (ii) only  
(c) (i) and (iii) only  
(d) (ii) and (iii) only  
(e) NOTA

(9) A linear system of two equations in the four variables \( x_1, x_2, x_3, x_4 \) row reduces to

\[
\begin{bmatrix}
1 & -2 & 0 & 3 & 5 \\
0 & 0 & 1 & -4 & 6
\end{bmatrix}
\]

If \( x_2 = 5 \) and \( x_4 = 7 \), what are the values of \( x_1 \) and \( x_3 \) ?

(a) \( x_1 = -11, x_3 = 28 \)  
(b) \( x_1 = 16, x_3 = -22 \)  
(c) \( x_1 = -6, x_3 = 34 \)  
(d) \( x_1 = -6, x_3 = 26 \)  
(e) NOTA
(10) Let \( A = \begin{bmatrix} 1 & 2 \\ 3 & -4 \end{bmatrix} \) and \( B = \begin{bmatrix} 4 & 3 \\ 1 & 1 \end{bmatrix} \). Find the top right element of \((A - B)A\)

(a) -10  (b) -5  (c) -3  (d) -2  (e) NOTA

(11) Given that the inverse matrix of

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

is \( A^{-1} = \begin{bmatrix} 3 & -1 & 1 \\ -4 & 2 & 1 \\ -1 & 0 & 1 \end{bmatrix} \)

what is the value of \( y \) when you solve the system

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

(a) 1  (b) 3  (c) -5  (d) -8  (e) NOTA

(12) In the standard method of finding the inverse of a \( 3 \times 3 \) matrix \( A \) by row reducing the matrix \([A \mid I_3]\), a student got to the partially reduced matrix

\[
\begin{bmatrix} 1 & -1 & 3 & 1 & 0 & 0 \\ 0 & 3 & -4 & -2 & 1 & 0 \\ 0 & -4 & 7 & 2 & 0 & 1 \end{bmatrix}
\]

Assuming the work is correct so far, what is the entry in row 3, column 1 of \( A^{-1} \)?

(a) \(-\frac{2}{3}\)  (b) \(-\frac{2}{5}\)  (c) \(\frac{4}{3}\)  (d) \(-\frac{4}{5}\)  (e) NOTA
(13) Which of the following systems have no solutions?

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

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

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

(a) I only
(b) I and II only
(c) II only
(d) III only
(e) Some other selection

(14) Write the system \[
\begin{cases}
x + y = z \\
\frac{x - y}{2} = 10 \\
17 - x - y + z = 0
\end{cases}
\]
as a single matrix equation.

(a) \[
\begin{bmatrix} 1 & 1 & 1 \\ \frac{1}{2} & \frac{1}{2} & 0 \\ 1 & -1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 10 \\ 17 \end{bmatrix}
\]

(b) \[
\begin{bmatrix} \frac{1}{2} & \frac{1}{2} & 0 \\ 1 & -1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 10 \\ 17 \end{bmatrix}
\]

(c) \[
\begin{bmatrix} 1 & 1 & -1 \\ \frac{1}{2} & -\frac{1}{2} & 0 \\ -1 & -1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 10 \\ 0 \end{bmatrix}
\]

(d) \[
\begin{bmatrix} 1 & 1 & -1 \\ \frac{1}{2} & -\frac{1}{2} & 0 \\ -1 & -1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 10 \\ -17 \end{bmatrix}
\]

(e) NOTA

(15) True or False? Consider the following two statements:

I. If a row in an augmented matrix contains all zeros, then the corresponding system of equations has infinitely many solutions.

II. It is impossible for a linear system of equations to have exactly two solutions.

(a) both I and II are true
(b) I is true, II is false
(c) I is false, II is true
(d) both I and II are false