Problem 1. **(1 point)**

Geometrically, the solution to the linear system

$$x+3y+2z=29$$
$$x+4y+3z=26$$
$$5x+2y+z=20$$

is the intersection of

• ?
• Three points
• Three lines
• Three planes
• Three nonlinear surfaces
• None of the above
.

In general, an intersection of this kind may include

- A. zero solutions
- B. one solution
- C. two solutions
- D. three solutions
- E. infinitely many solutions

(Select all that are correct.)
Answer(s) submitted:

- Three planes
- ABE

submitted: (correct)
recorded: (correct)

Problem 2. **(1 point)**

Identify each of the following as true or false:
For every positive integer n, $\mathbb{R}^n$ is a vector space. [?/True/False]
The columns of an $n \times m$ matrix are elements of the vector space $\mathbb{R}^m$. [?/True/False]
Answer(s) submitted:

- True
- False

submitted: (correct)
recorded: (correct)

Problem 3. **(1 point)**

Consider the augmented matrix

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

What system of equations (in x and y) does this represent?
_____ = _____,
_____ = _____
Answer(s) submitted:

- $-x+4y$
- 0
- $3x+4y$
- 1

submitted: (correct)
recorded: (correct)

Problem 4. **(1 point)**

Which of the following matrices are in rref?

- A. $\begin{bmatrix} 0 & 0 & 0 & -1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$
- B. $\begin{bmatrix} 1 & 2 & 0 & 0 & 3 & 2 \\ 0 & 0 & 1 & 0 & -1 & 4 \\ 0 & 0 & 0 & 1 & -2 & 3 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
- C. $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$
- D. $\begin{bmatrix} 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 2 & 0 \\ 0 & 0 & 1 & 3 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$

Answer(s) submitted:

- BC

submitted: (correct)
recorded: (correct)

Problem 5. **(1 point)**

Which of the following matrices may be obtained by performing *exactly one elementary row operation* on the matrix $\begin{bmatrix} 1 & 3 & 0 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$?

- A. $\begin{bmatrix} 1 & 3 & 0 \\ 3 & 1 & 3 \\ 1 & 0 & 1 \end{bmatrix}$
- B. $\begin{bmatrix} 4 & 12 & 0 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$
- C. $\begin{bmatrix} 1 & 3 & 0 \\ 0 & 1 & 3 \\ 3 & 9 & 1 \end{bmatrix}$
- D. $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$
- E. $\begin{bmatrix} 0 & 0 & 1 \\ 1 & 3 & 0 \\ 0 & 1 & 3 \end{bmatrix}$

Answer(s) submitted:

- BC

submitted: (correct)
recorded: (correct)