This print-out should have 10 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001   10.0 points

If the augmented matrix for a system of linear equations in variables x_1, x_2, and x_3 is row equivalent to the matrix

$$B = \begin{bmatrix} 1 & 2 & -1 & -5 \\ 0 & 1 & -1 & -1 \\ 0 & 0 & 2 & -4 \end{bmatrix},$$

determine x_1.

1. $x_1 = -2 + t,$ t arbitrary

2. $x_1 = -1 + t,$ t arbitrary

3. $x_1 = 0$

4. $x_1 = -1$

5. $x_1 = -2$

6. system inconsistent

002   10.0 points

If the augmented matrix for a system of linear equations in variables x_1, x_2, and x_3 is row equivalent to the matrix

$$B = \begin{bmatrix} 3 & 9 & 6 & -15 \\ -3 & -9 & -9 & 18 \\ -1 & -3 & -5 & 8 \end{bmatrix},$$

determine x_1.

1. $x_1 = -1 - 3t,$ t arbitrary

2. $x_1 = 2$

3. $x_1 = -3 - 3t,$ t arbitrary

4. $x_1 = -3$

5. $x_1 = -1$

6. system inconsistent

003   10.0 points

If the augmented matrix for a system of linear equations in variables x_1, x_2, and x_3 is row equivalent to the matrix

$$B = \begin{bmatrix} 1 & -1 & 5 & 2 \\ 0 & -3 & 9 & -3 \\ 0 & 1 & -3 & 4 \end{bmatrix},$$

determine x_1.

1. $x_1 = 2$

2. system inconsistent

3. $x_1 = 2 + t,$ t arbitrary

4. $x_1 = 0$

5. $x_1 = 1$

6. $x_1 = 1 + t,$ t arbitrary

004   10.0 points

Determine the Reduced Row Echelon Form of the matrix

$$A = \begin{bmatrix} 1 & -1 & -3 \\ -3 & 4 & 6 \\ -1 & 0 & 6 \end{bmatrix}.$$

1. $\mathrm{rref}(A) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

2. $\mathrm{rref}(A) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

3. $\mathrm{rref}(A) = \begin{bmatrix} 1 & 0 & -6 \\ 0 & 1 & -3 \\ 0 & 0 & 0 \end{bmatrix}$

4. $\mathrm{rref}(A) = \begin{bmatrix} 1 & 2 & -6 \\ 0 & 1 & -3 \\ 0 & 0 & 0 \end{bmatrix}$

5. $\mathrm{rref}(A) = \begin{bmatrix} 1 & 1 & -6 \\ 0 & 1 & -3 \\ 0 & 0 & 0 \end{bmatrix}$

005   10.0 points

Determine the Reduced Row Echelon Form of the matrix

$$A = \begin{bmatrix} 1 & 1 & -1 \\ 1 & 1 & -3 \\ 2 & 2 & -5 \end{bmatrix}.$$

1. $\text{rref}(A) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

2. $\text{rref}(A) = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$

3. $\text{rref}(A) = \begin{bmatrix} 1 & 0 & -1 \\ 0 & 0 & -2 \\ 0 & 0 & 1 \end{bmatrix}$

4. $\text{rref}(A) = \begin{bmatrix} 1 & 1 & -1 \\ 0 & 0 & -2 \\ 0 & 0 & 1 \end{bmatrix}$

5. $\text{rref}(A) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

006   10.0 points

Determine the Reduced Row Echelon Form of the matrix

$$A = \begin{bmatrix} 3 & 3 & -15 \\ -2 & 0 & 6 \\ -2 & -4 & 14 \end{bmatrix}.$$

1. $\text{rref}(A) = \begin{bmatrix} 1 & 0 & -3 \\ 0 & 1 & -2 \\ 0 & 0 & 0 \end{bmatrix}$

2. $\text{rref}(A) = \begin{bmatrix} 1 & 0 & -2 \\ 0 & 1 & -3 \\ 0 & 0 & 0 \end{bmatrix}$

3. $\text{rref}(A) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

4. $\text{rref}(A) = \begin{bmatrix} 1 & -2 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$

5. $\text{rref}(A) = \begin{bmatrix} 1 & -3 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$

007   10.0 points

Determine the Reduced Row Echelon Form of the matrix

$$A = \begin{bmatrix} 3 & -3 & -3 & 6 \\ 3 & -1 & -5 & 8 \\ -1 & -1 & 3 & -2 \end{bmatrix}.$$

1. $\text{rref}(A) = \begin{bmatrix} 1 & -2 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

2. $\text{rref}(A) = \begin{bmatrix} 1 & -2 & 0 & -2 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

3. $\text{rref}(A) = \begin{bmatrix} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 3 \end{bmatrix}$

4. $\text{rref}(A) = \begin{bmatrix} 1 & 0 & -2 & 0 \\ 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

5. $\text{rref}(A) = \begin{bmatrix} 1 & 0 & -2 & -2 \\ 0 & 1 & -1 & 3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

008   5.0 points

Every matrix is row equivalent to a unique matrix in echelon form.

True or False?

1. TRUE

2. FALSE

009   5.0 points

If [0 0 0 0 1] is one row in an echelon form of an augmented matrix, then the associated linear system is inconsistent.

True or False?

1. FALSE

2. TRUE

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010   5.0 points

If a system of linear equations has two different solutions, it must have infinitely many solutions.

True or False?

1. TRUE

2. FALSE