

1. Consider the following system of equations in two variables.

1 point

$$\begin{cases} x + 3y = 15 \\ 3x + 12y = 3 \end{cases}$$

Check all the options that are **true, given the system above**.

☒  $4x + 15y = 18$ .

☒  $y = -14$ .

☐  $x + 3y = 0$ .

☒  $2x + 6y = 30$ .

2. Consider the following system of equations in two variables.

1 point

$$\begin{cases} 2x + y = 5 \\ 4x + 2y = 10 \end{cases}$$

Check all the options that are **true, given the system above**.

☐  $x = 0$  and  $y = 5$  is a solution for this system.

☐ The solution for this system has 0 degrees of freedom.

☒ The system has infinitely many solutions.

☐ The system has no solution.

3. Consider the following system of equations.

1 point

$$\begin{cases} x + 2y + 3z = 10 \\ 2x + 6y + 12z = 4 \\ 4x - 8y + 4z = 8 \end{cases}$$

The value for  $z$  is:

Hint: You may use the Elimination Method, discussed in lecture  
[Solving system of equations with more variables](#). [↗](#)

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4. Consider the following matrix:

1 point

$$\begin{bmatrix} 3 & 1 \\ 6 & 2 \end{bmatrix}$$

Its rank is:

☐ 0

☒ 1

☐ 2

5. Check all matrices that are in row echelon form.

1 point

☒  $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{bmatrix}$

☒  $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

☐  $\begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$

☒  $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

6. Check all the options that are a row echelon form of the following matrix.

1 point

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

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

☐  $\begin{bmatrix} 1 & 3 & 2 \end{bmatrix}$

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

☐

$$\begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

☐

$$\begin{bmatrix} 0 & 0 & 1 \\ 1 & 3 & 2 \\ 0 & 1 & -\frac{1}{6} \end{bmatrix}$$

7. Compute the rank of the following matrix:

1 point

$$\begin{bmatrix} 2 & 1 & 5 \\ 1 & 3 & 1 \\ 3 & 4 & 6 \end{bmatrix}$$

2

8. Let  $M$  be a  $2 \times 2$  matrix. Check all sentences that are true.

1 point

- ☐ Multiplying a row by a non-zero real number does not affect its **determinant**.
- ☒ Multiplying a row by a non-zero real number does not affect its **singularity**.
- ☒ Swapping its rows change the determinant sign if the determinant is non-zero.
- ☐ Replacing one row by the sum of the two rows of the matrix does not affect singularity, but it does affect the determinant value.