Congratulations! You passed!

Grade received 88.88% **Latest Submission Grade** 88.89% **To pass** 80% or higher

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1. Maria, in her weekly grocery shopping, always buys bananas, apples and cherries. She does not remember the price for each fruit individually, but she can remember her last three grocery purchases.

1 / 1 point

Purchase 1: 10 bananas, 5 apples and 10 cherries, costing US$ 5.00

Purchase 2: 5 bananas, 10 apples and 15 cherries, costing US$ 7.00

Purchase 3: 6 bananas, 4 apples and 5 cherries, costing US$ 6.00

Denote b for banana, a for apple and c for cherry.

Which of the following systems of equations represents the correct information in the above system of sentences?

- ○ $$\begin{cases} 10b + 5a + 10c = 5 \\ 5b + 10a + 15c = 7 \end{cases}$$

- ○ $$\begin{cases} 10b + 5b + 6b = 5 \\ 5a + 10a + 4a = 7 \\ 10c + 15c + 5c = 6 \end{cases}$$

- ○ $$\begin{cases} 10b + 5a + 10c = 0 \\ 5b + 10a + 15c = 0 \\ 6b + 4a + 5c = 0 \end{cases}$$

- ◉ $$\begin{cases} 10b + 5a + 10c = 5 \\ 5b + 10a + 15c = 7 \\ 6b + 4a + 5c = 6 \end{cases}$$

Correct

There are three sentences and this system of equations has three equations, this is the first check. The first sentence corresponds to the first equation since $10b$ corresponds to 10 bananas, $5a$ to 5 apples and $10c$ to 10 cherries. Finally, the total purchase value is 5.

2. Consider the following system of equations:

1 / 1 point

$$\begin{cases} 3x + 2y + z = 10 \\ x + y + 2z = 5 \\ 5x - 6y + 3z = 2 \end{cases}$$

Which of the following matrices can be used to study the singularity of the system of equations above?

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

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

- ○ $\begin{bmatrix} 2 & 1 & 0 \\ 1 & 2 & 0 \\ 2 & 1 & 0 \end{bmatrix}$

- ○ $\begin{bmatrix} 3 & 2 & 1 & 10 \\ 1 & 1 & 2 & 5 \\ 5 & -6 & 3 & 2 \end{bmatrix}$

Correct

You've obtained this matrix by stacking horizontally every constant term of every unkown variable in the system of equations. This is the matrix that you can use to study the singularity of the system.

3. Calculate the determinant of the following matrix:

1 / 1 point

$$\begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 1 \\ -1 & 2 & 1 \end{bmatrix}$$

Hint: To find the determinant, apply the method described in the lecture [The determinant (3x3)]()

- ○ 0. Singular.
- ○ -2. Singular.
- ◉ -2. Non-singular.
- ○ 2. Singular.

Correct

You have correctly calculated the determinant and identified the non singularity of the matrix.

4. Determine if the following matrix has linearly dependent or independent rows.

1 / 1 point

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

- ◉ Linearly independent.
- ○ It cannot be determined.
- ○ Linearly dependent.

Correct

The matrix has linearly independent rows. You cannot obtain one row by using row operations on the other rows. If you calculate the determinant of this matrix you'll also find it is not equal to 0, another indication that the matrix is non-singular and that the rows are independent.

5. Consider the following matrix.

1 / 1 point

$$\begin{bmatrix} 2 & 1 & 5 \\ 1 & 2 & 1 \\ \mathbf{x} & \mathbf{y} & \mathbf{z} \end{bmatrix}$$

For which values x, y, and z does the matrix have linearly dependent rows?

- ○ $x = 1, y = 2, z = 3$
- ◉ $x = 3, y = 3, z = 6$
- ○ $x = 1, y = 3, z = 3$

Correct

By adding the first two rows, you get the values $x = 3$ by $(2 + 1), y = 3$ by $(1 + 2)$, and $z = 6$ by $(5 + 1)$. For these values, the matrix has linearly dependent rows.

6. Calculate the determinant of the following matrix.

1 / 1 point

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 2 \\ 1 & 4 & 5 \end{bmatrix}$$

- ○ $\det(A) = 5$. The matrix is non-singular.
- ◉ $\det(A) = 0$. The matrix is singular.
- ○ $\det(A) = 0$. The matrix is non-singular.

Correct

Correct! The determinant for the given matrix is 0, therefore the matrix is singular.

7. Select which of the following are true for **non-singular matrices**.

1 / 1 point

- [ ] In a non-singular matrix, one row can be a multiple of another one.
- [ ] In a non-singular matrix, rows are linearly dependent.
- [x] In a non-singular matrix, rows are linearly independent.

Correct
Non-singular matrices have linearly independent rows.

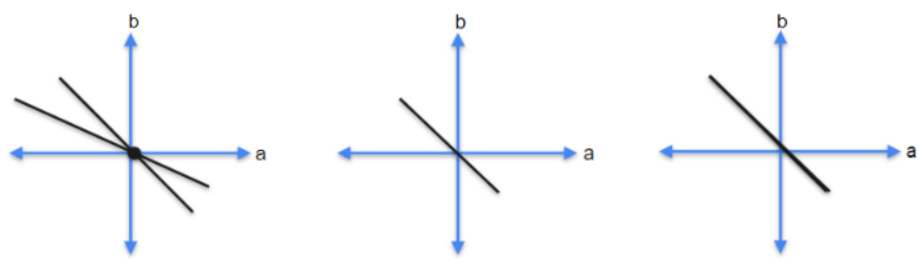
- [x] In a non-singular matrix there is only a unique solution for the represented system of equations.

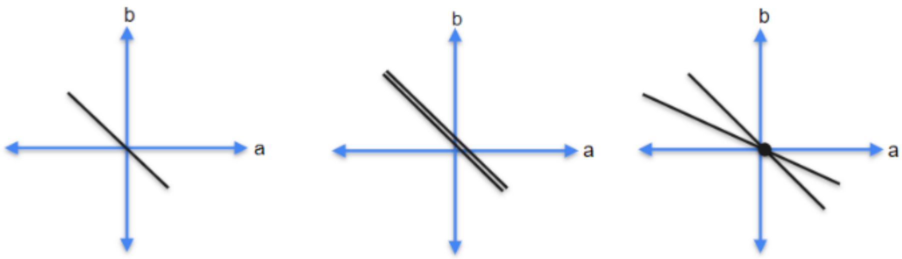
Correct
Since the rows are linearly independent in the non-singular matrix, you can find a unique solution for the represented system of equations.

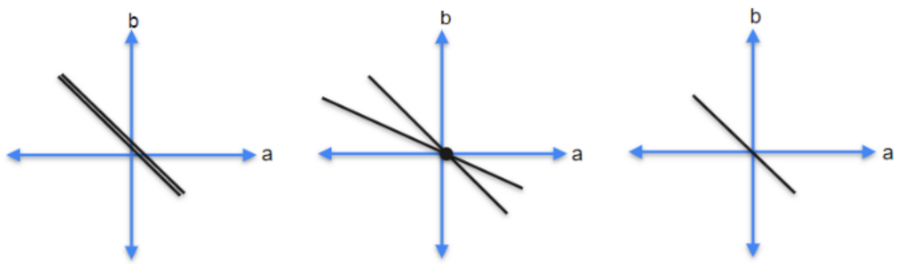
8. Choose the sequence of lines that represent a linear system such that the systems have, in this order:

1 / 1 point

1. zero solutions, 2. just one solution, 3. infinitely many solutions.







Correct
You can visually determine how many solutions a system of linear equations has by following these rules: If the lines are parallel, the system has no solutions; if the lines intersect at just one point, the system has just one solution and the solution is the point where they intersect. If the lines totally overlap, the system has infinitely many solutions.

9. Select the correct sequence of graphs that represents a linear system with, respectively:

0 / 1 point

1. zero solutions, 2. just one solution, 3. infinitely many solutions.

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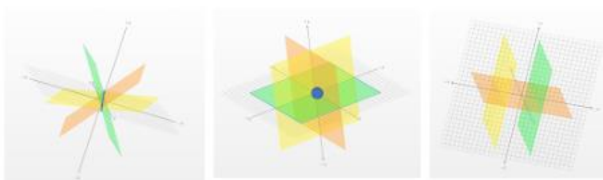
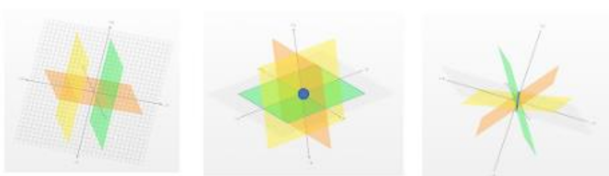
- (•) 

- ( ) 

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