1. A company produces three items: aprons, bags and coasters. The company wants to know how long it takes to produce each item.

    1 point

    - On the first day, the company spent 5 hours to make 5 aprons, 10 bags, and 10 coasters.
    - On the second day, the company spent 7 hours to make 10 aprons, 5 bags, and 15 coasters.
    - On the third day, the company spent 6 hours to make 4 aprons, 6 bags, and 5 coasters.

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

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

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

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

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

2. Consider the following system of equations:

    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?

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

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

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

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

3. Calculate the determinant of the following matrix:

    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)](#) ☑

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

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

    1 point

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

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

5. Consider the following matrix.

    1 point

    $$\begin{bmatrix} 2 & 1 & 5 \\ \cdots \end{bmatrix}$$

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

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

○ $x = 1, y = 2, z = 3$

○ $x = 1, y = 3, z = 3$

◉ $x = 3, y = 3, z = 6$

6. Calculate the determinant of the following matrix.   **1 point**

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

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

◉ $\det(A) = 0$. The matrix is singular.

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

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

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

☑ In a non-singular matrix, rows are linearly independent.

8. Choose the sequence of lines that represent a linear system such that the systems have, in this order: **1 point**
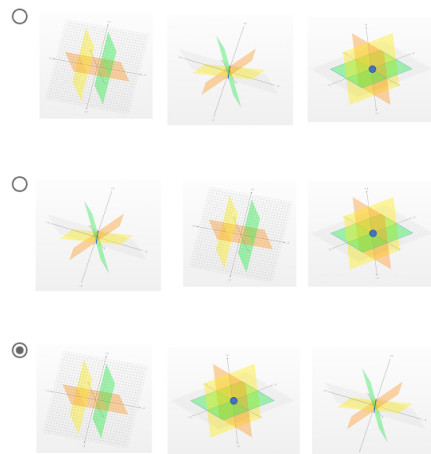
1. zero solutions, 2. just one solution, 3. infinitely many solutions.

○

◉

○
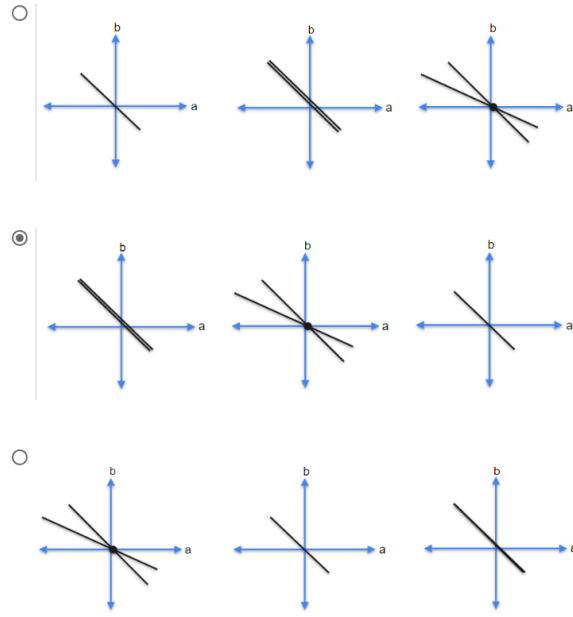
9. Select the correct sequence of graphs that represents a linear system with, respectively: **1 point**

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

○

○

◉