1. Let T be a linear transformation in the plane represented by the following matrix: 1 point

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

The rank of T is:

- ○ 3
- ○ 1
- ○ 0
- ◉ 2

2. Consider the linear transformation T that maps the vectors (1,0) and $(0,1)$ in the following manner: 1 point

$$T(0,1) = (2,5)$$
$$T(1,0) = (3,1)$$

The area of the parallelogram spanned by transforming the vectors $(0,1)$ and $(1,0)$ is:

-13

3. Consider the following three matrices 1 point

$$M_1 = \begin{bmatrix} 2 & 1 \\ 3 & 1 \end{bmatrix}$$

$$M_2 = \begin{bmatrix} 3 & 5 \\ 1 & 1 \end{bmatrix}$$

$$M_3 = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$$

The determinant of $M_1 \cdot M_2 \cdot M_3$ is equal to:

-4

4. Let M and N be two square matrices with the same size. 1 point

Check all statements that are true.

- ☑ If M and N are non-singular matrices, then so is $M \cdot N$.
- ☑ If M is singular, then $M \cdot N$ is singular for any matrix N.
- ☐ If $M \cdot N$ is singular, then M **and** N are singular.
- ☐ $\det(M+N) = \det(M) + \det(N)$.

5. Let M be the following 3×3 matrix: 1 point

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

Compute $\det(M^{-1})$. Please provide your solution in decimal notation not in fraction, using one decimal place.

-0.5