

1. Evaluate the determinant of the following matrices:

a) $A = \begin{bmatrix} -2 & -4 & 1 \\ 6 & 1 & 1 \\ -2 & -1 & 3 \end{bmatrix}$

b) $B = \begin{bmatrix} -2 & -1 & 4 & -6 \\ 0 & 1 & 0 & 2 \\ 0 & -6 & 3 & 2 \\ 0 & 8 & 5 & 1 \end{bmatrix}$

$$\text{c)} \quad C = \begin{bmatrix} e^{-3t} & e^{4t} \\ -3e^{-3t} & 4e^{4t} \end{bmatrix}$$

$$\text{d)} \quad D = \begin{bmatrix} \sin 2t & \cos 2t & 1 \\ 2 \cos 2t & -2 \sin 2t & 0 \\ -4 \sin t & -4 \cos 2t & 0 \end{bmatrix}$$

2. Using determinant to find equation of a line passing thru $(2, -3)$ and $(-2, 5)$

3. Using determinant to find constant k so that the following system has a non-trivial solution:

$$\begin{cases} 10x + ky - z = 0 \\ kx + y - z = 0 \\ 2x + y - 3z = 0 \end{cases}$$

4. Find constant λ so that following matrices are singular.

a)
$$\begin{bmatrix} -2-\lambda & -6 \\ 3 & 4-\lambda \end{bmatrix}$$

b)
$$\begin{bmatrix} 2-\lambda & -1 & 3 \\ 3 & 1-\lambda & 0 \\ 2 & 3 & 3-\lambda \end{bmatrix}$$

5. Solve the following by using Cramer's rule:

$$\begin{cases} 4x_1 + 4x_2 + 4x_3 = 5 \\ 4x_1 - 2x_2 + 3x_3 = 1 \\ 8x_1 + 2x_2 - 4x_3 = 6 \end{cases}$$