

VGA

Determinantes

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

$$D = \begin{vmatrix} 2 & 0 \\ -3 & 1 \end{vmatrix} = 2 - 0 = 2$$

Diagram showing the calculation of the determinant for matrix M. Red arrows indicate the diagonal elements: 2 (top-left) and 1 (bottom-right) are circled in red and labeled (II) and (I) respectively. Red arrows also indicate the off-diagonal elements: 0 (top-right) and -3 (bottom-left) are crossed out with red 'X' marks.

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

$$D = \begin{vmatrix} 1 & 3 \\ -2 & 1 \end{vmatrix} = 1 - (-6) = 1 + 6 = 7$$

Diagram showing the calculation of the determinant for matrix A. Red arrows indicate the diagonal elements: 1 (top-left) and 1 (bottom-right) are circled in red and labeled (I) and (II) respectively. Red arrows also indicate the off-diagonal elements: 3 (top-right) and -2 (bottom-left) are crossed out with red 'X' marks.

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

$$D = \begin{vmatrix} 1 & 0 & 2 & 1 & 0 \\ -1 & 3 & 0 & -1 & 3 \\ 2 & 1 & -2 & 2 & 1 \end{vmatrix} = -8 - 12 = -20$$

Diagram showing the calculation of the determinant for matrix B using Sarrus' rule. Red arrows indicate the products of the three diagonals going down-right and up-right. The products are circled in red and labeled (II) and (I) respectively. Red arrows also indicate the off-diagonal products that are subtracted.

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

$$D = \begin{vmatrix} 1 & 0 & -1 & 1 & 0 \\ 3 & 2 & 0 & 3 & 2 \\ -2 & 3 & 1 & -2 & 3 \end{vmatrix} = -7 - 4 = -11$$

Diagram showing the calculation of the determinant for matrix C using Sarrus' rule. Red arrows indicate the products of the three diagonals going down-right and up-right. The products are circled in red and labeled (II) and (I) respectively. Red arrows also indicate the off-diagonal products that are subtracted.

EXERCÍCIOS

13.1. Calcule os determinantes:

$$\text{a) } \begin{vmatrix} 2 & 3 \\ -1 & 2 \end{vmatrix}$$

$$\text{b) } \begin{vmatrix} 0 & -1 \\ 2 & 7 \end{vmatrix}$$

$$\text{c) } \begin{vmatrix} 6 & 1 \\ -1 & 0 \end{vmatrix}$$

13.2. Calcule os determinantes:

$$\text{a) } \begin{vmatrix} 2 & 3 & 0 \\ -1 & 2 & 0 \\ 0 & 1 & -1 \end{vmatrix}$$

$$\text{b) } \begin{vmatrix} 0 & -1 & 3 \\ 2 & 2 & 0 \\ 3 & 0 & 1 \end{vmatrix}$$

$$\text{c) } \begin{vmatrix} 6 & 1 & 2 \\ -1 & 0 & 0 \\ 2 & 0 & 1 \end{vmatrix}$$