

Determinantes - Matriz de Ordem 1, 2 e 3 - Tarefa Básica

Determinantes

Tipos Básicos:

1)

a.

$$\begin{bmatrix} 2 & 3 \\ 1 & 5 \end{bmatrix} = 2 \cdot 5 - 1 \cdot 3 = \boxed{7}$$

$$b) \begin{bmatrix} -2 & -4 \\ 3 & 6 \end{bmatrix} (-2 \cdot 6) - (3 \cdot -4) = 0$$

c)

$$\begin{bmatrix} 3 & -1 & 1 \\ 2 & 1 & -1 \\ 1 & 4 & -2 \end{bmatrix}$$

↓

$$\begin{bmatrix} 3 & -1 & 1 & 3 & -1 \\ 2 & 1 & -1 & 2 & 1 \\ 1 & 4 & -2 & 1 & 4 \end{bmatrix} = \begin{array}{l} -6 + 1 + 8 = 3 \\ 1 - 12 + 4 = -7 \\ 3 + 7 = 10 \end{array}$$

$$d) \begin{bmatrix} 3 & 2 & -1 \\ 2 & 3 & 1 \\ 1 & 1 & 4 \end{bmatrix}$$

↓

$$\begin{array}{ccccc} 3 & 2 & -1 & 3 & 2 \\ 2 & 3 & 1 & 2 & 3 \\ 1 & 1 & 4 & 1 & 1 \end{array} = \begin{array}{l} 36 + 2 - 2 = 36 \\ -3 + 3 + 16 = 16 \\ 36 - 16 = 20 \end{array}$$

2.

$$A = (a_{ij})$$

$$A = \begin{bmatrix} -3 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & -3 \end{bmatrix}$$

↓

$$\begin{array}{ccccc} -3 & 0 & 0 & -3 & 0 & -27 + 0 + 0 = -27 \\ 0 & -3 & 0 & 0 & -3 & 0 + 0 + 0 = 0 \\ 0 & 0 & -3 & 0 & 0 & -27 - 0 = -27 \end{array}$$

Setra A

3.

$$\begin{array}{ccccc} x & 1 & x & x & 1 \\ 3 & x & 4 & 3 & x \\ 1 & 3 & 3 & 1 & 3 \end{array}$$

$$3x^2 + 4 + 9x$$

$$x^2 + 12x + 9$$

$$3x^2 + 4 + 9x - (x^2 + 12x + 9)$$

$$2x^2 - 3x - 5 = -3$$

$$2x^2 - 3x - 2 = 0$$

$$\frac{3 \pm \sqrt{A}}{4}$$

$$\Delta = 9 - (4 \cdot 2 \cdot -2)$$

$$\Delta = 25$$

$$\frac{3 \pm \sqrt{25}}{4}$$

$$\begin{array}{c} \swarrow \quad \searrow \\ -\frac{1}{2} \quad 2 \end{array}$$

tetra E

4.

$$\begin{array}{ccccc} x-1 & -1 & 0 & x-1 & -1 \\ 0 & x+1 & -1 & 0 & x+1 \\ 2 & -1 & x+1 & 2 & -1 \end{array}$$

$$(x-1) \cdot (x+1) \cdot (x+1)$$

$$(x+1)^2 \cdot (x-1) = x^3 + x^2 - x - 1$$

$$(x^3 + x^2 - x - 1) + (2) + (-1) = x^3 + x^2 - x$$

$$2x + 2 + x - 1 - x - 1$$

$$x^3 + x^2 - x - 2x = 2$$

$$x^3 + x^2 - 3x - 2 = 0$$

↓

$$\text{Rozys} = -2, \frac{1-\sqrt{5}}{2}, \frac{1+\sqrt{5}}{2}$$

$$2 + \frac{1-\sqrt{5}}{2} + \frac{1+\sqrt{5}}{2} = -1$$

Setra C

5.

$$A = (a_{ij})_{3 \times 2}$$

$$a_{ij} = 2i - 3j$$

$$B = (b_{ij})_{3 \times 2}$$

$$b_{ij} = j - i$$

$$\begin{bmatrix} -1 & -4 \\ 1 & -2 \\ 3 & 0 \end{bmatrix}$$

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

$$\begin{array}{c|c|c} 0+4 & -1+0 & -2-4 \\ 0+2 & 1+0 & 2-2 \\ 0+0 & 3+0 & 6+0 \end{array}$$

$$\begin{array}{c|c|c} 4 & -1 & -6 \\ 2 & 1 & 0 \\ 0 & 3 & 6 \end{array}$$

$$\begin{array}{c|c|c|c|c|c} 4 & -1 & -6 & 4 & -1 \\ 2 & 1 & 0 & 2 & 1 \\ 0 & 3 & 6 & 0 & 3 \end{array}$$

~~$$\begin{array}{c|c|c|c|c|c} 4 & -1 & -6 & 4 & -1 \\ 2 & 1 & 0 & 2 & 1 \\ 0 & 3 & 6 & 0 & 3 \end{array}$$~~

~~$$\begin{array}{c|c|c|c|c|c} 4 & -1 & -6 & 4 & -1 \\ 2 & 1 & 0 & 2 & 1 \\ 0 & 3 & 6 & 0 & 3 \end{array}$$~~

$$24 + 0 - 36 = -12$$

$$0 + 0 - 12 = -12$$

$$-12 - (-12) = 0$$

Setra C

6.

$$A = \begin{bmatrix} 2 & 0 & -1 \\ -1 & 1 & 0 \end{bmatrix} \quad \beta = \begin{bmatrix} 1 & -1 \\ -1 & 1 \\ 0 & 2 \end{bmatrix}$$

$$\begin{array}{ccc|ccc} 2 & 0 & 0 & -2 & 0 & -2 \\ -1 & -1 & 0 & 1 & 1 & 0 \end{array}$$

$$\begin{bmatrix} 2 & -4 \\ -2 & 2 \end{bmatrix}$$

$$2 \cdot 2 - (-2 \cdot -4) = -4$$

Setra D