

GABARITO

1

$$\begin{bmatrix} 4 & 3 & -1 \\ 2 & 5 & -1 \\ 2 & 3 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ 2 \end{bmatrix} = \begin{bmatrix} 2 \\ 0 \\ 4 \end{bmatrix} \quad \lambda = 2$$

$$\begin{bmatrix} 4 & 3 & -1 \\ 2 & 5 & -1 \\ 2 & 3 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 5 \end{bmatrix} = \begin{bmatrix} 2 \\ 2 \\ 10 \end{bmatrix} \quad \lambda = 2$$

$$\begin{bmatrix} 4 & 3 & -1 \\ 2 & 5 & -1 \\ 2 & 3 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 6 \\ 6 \\ 6 \end{bmatrix} \quad \lambda = 6$$

a

$$\text{(b)} \quad D = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 6 \end{bmatrix} \quad B = \begin{bmatrix} 2 & 2 & 6 \\ 0 & 2 & 6 \\ 4 & 10 & 6 \end{bmatrix}$$

$$B e_1 = v_1 \Rightarrow B^{-1} v_1 = e_1$$

$$B e_2 = v_2 \Rightarrow B^{-1} v_2 = e_2$$

$$B e_3 = v_3 \Rightarrow B^{-1} v_3 = e_3$$

$$\text{Daí, } \underbrace{B^{-1} M B e_i}_{\lambda_i v_i} = \lambda_i B^{-1} v_i = \lambda_i e_i$$

$$D e_i = \lambda_i e_i$$

$$\text{Então } B^{-1} M B = D$$

$$\text{(Pois } (B^{-1} M B) e_i = B^{-1} (M (B e_i)) \text{)}$$