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« مسئله عید »

زهرا دستگر ارانی ۹۵۳۱۰۷٤

• دترمینان ماتریس های زیر را بیابید.

$$A = \begin{bmatrix} 0 & 0 & a_1 & b_1 \\ 0 & 0 & a_2 & b_2 \\ a_3 & b_3 & 0 & 0 \\ a_4 & b_4 & 0 & 0 \end{bmatrix}$$

$$\det A = a_1 \times \det \begin{bmatrix} 0 & 0 & b_2 \\ a_3 & b_3 & 0 \\ a_4 & b_4 & 0 \end{bmatrix} - b_1 \times \det \begin{bmatrix} 0 & 0 & a_2 \\ a_3 & b_3 & 0 \\ a_4 & b_4 & 0 \end{bmatrix}$$

$$\Rightarrow \det A = a_1 \times b_2 \times \det \begin{bmatrix} a_3 & b_3 \\ a_4 & b_4 \end{bmatrix} - b_1 \times a_2 \times \det \begin{bmatrix} a_3 & b_3 \\ a_4 & b_4 \end{bmatrix}$$

$$\Rightarrow \det A = a_1 b_2 (a_3 b_4 - a_4 b_3) - b_1 a_2 (a_3 b_4 - a_4 b_3)$$

$$\Rightarrow \det A = (a_3 b_4 - a_4 b_3)(a_1 b_2 - a_2 b_1)$$

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$$B = \begin{bmatrix} a_1 & 0 & 0 & b_1 \\ 0 & a_2 & b_2 & 0 \\ 0 & b_3 & a_3 & 0 \\ b_4 & 0 & 0 & a_4 \end{bmatrix}$$

$$\det B = a_1 \times \det \begin{bmatrix} a_2 & b_2 & 0 \\ b_3 & a_3 & 0 \\ 0 & 0 & a_4 \end{bmatrix} - b_1 \times \det \begin{bmatrix} 0 & a_2 & b_2 \\ 0 & b_3 & a_3 \\ b_4 & 0 & 0 \end{bmatrix}$$

$$\Rightarrow \det B = a_1 \times a_4 \times \det \begin{bmatrix} a_2 & b_2 \\ b_3 & a_3 \end{bmatrix} - b_1 \times b_4 \times \det \begin{bmatrix} a_2 & b_2 \\ b_3 & a_3 \end{bmatrix}$$

$$\Rightarrow \det B = a_1 a_4 (a_2 a_3 - b_2 b_3) - b_1 b_4 (a_2 a_3 - b_2 b_3)$$

$$\Rightarrow \det B = (a_2 a_3 - b_2 b_3)(a_1 a_4 - b_1 b_4)$$