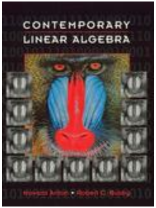
Chapter 6 , Section 4 of *Contemporary Linear Algebra* by Anton and Busby



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1. Let $S(x, y, z) = (4x, -2x + y, -x - 3y)$ and $T(x, y, z) = (x + 2y, -z, 4x - z)$. Then $S(T(x, y, z))$ is

A $(4x + 8y, -2x - 4y - z, -x - 2y + 3z)$

B $(4x, -2x + y, -x - 3y)$

C $(5x + 2y, -2x - +y - z, 3x - 4z)$

D $(2y, x + 3y, 17x + 3y)$

E $(4x^2 + 8xy, 2xz - yz, -4x^2 - 12xy + xz + 3yz)$

Next Question

2. Find the standard matrix for the following operator on $\mathbf{R}^2$: A rotation of $\pi/3$ (60^o) followed by an orthogonal projection on the x-axis followed by a reflection about the line $y = x$.

A $\begin{pmatrix} 0 & 0 \\ \frac{1}{2} & \frac{\sqrt{3}}{2} \end{pmatrix}$ B $\begin{pmatrix} 0 & 0 \\ \frac{1}{2} & -\frac{\sqrt{3}}{2} \end{pmatrix}$

C $\begin{pmatrix} \frac{\sqrt{3}}{2} & \frac{1}{2} \\ \frac{1}{2} & -\frac{\sqrt{3}}{2} \end{pmatrix}$ D $\begin{pmatrix} \frac{\sqrt{3}}{2} & \frac{1}{2} \\ 0 & 0 \end{pmatrix}$

E $\begin{pmatrix} \frac{1}{2} & -\frac{\sqrt{3}}{2} \\ \frac{\sqrt{3}}{2} & \frac{1}{2} \end{pmatrix}$

Next Question

3. The matrix

$$A = \begin{pmatrix} 1 & -4 \\ 2 & -7 \end{pmatrix}$$

corresponds to a

▸ A shear in the x-direction, factor 2 followed by a shear in the y-direction, factor -4.

▸ B shear in the x-direction, factor 4, followed by an expansion in the y-direction, factor 2.

▸ C shear in the x-direction, factor -4, followed by a shear in the y-direction, factor 2.

▸ D shear in the y-direction, factor -4, followed by a shear in the x-direction, factor 2.

▸ E shear in the y-direction, factor 2, followed by a shear in the x-direction, factor -4.

Next Question

4. Let $U : \mathbf{R}^3 \to \mathbf{R}^3$ be defined by $U(x_1, x_2, x_3) = (w_1, w_2, w_3)$ where

$$w_1 = x_1 + 2x_2 + x_3, \quad w_2 = 2x_1 + x_2 + 4x_3, \quad w_3 = 7x_1 + 4x_2 + 5x_3.$$

Then $U^{-1}(w_1, w_2, w_3)$ is

- A $(w_1 - 3w_2 + 4w_3, -w_1 + w_2 + w_3, -2w_2 + 5w_3)$
- B $(x_1 - 3x_2 + 4x_3, -x_1 + x_2 + x_3, -2x_2 + 5x_3)$
- C $\frac{1}{26}(-11x_1 - 6x_2 + 7x_3, 18x_1 - 2x_2 - 2x_3, x_1 + 10x_2 - 3x_3)$
- D $(-11w_1 - 6w_2 + 7w_3, 18w_1 - 2w_2 - 2w_3, w_1 + 10w_2 - 3w_3)$
- E $\frac{1}{26}(-11w_1 - 6w_2 + 7w_3, 18w_1 - 2w_2 - 2w_3, w_1 + 10w_2 - 3w_3)$

Next Question

5. Suppose V and W are linear operators on $\mathbf{R}^n$ such that V is one-to-one and W is onto. Then

- A $V \circ W$ is one-to-one and onto.
- B $V \circ W$ is one-to-one but may not be onto.
- C $V \circ W$ is onto but may not be one-to-one.
- D $W \circ V$ is one-to-one but may not be onto.
- E $W \circ V$ is onto but may not be one-to-one.

No more questions

RIGHT!

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Wrong...try again

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