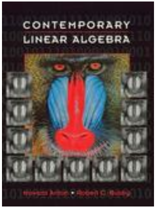
Chapter 6 , Section 1 of *Contemporary Linear Algebra* by Anton and Busby



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1. Which one of the following defines a linear transformation?

- A $T(x, y) = (x/2, y - 5)$
- B $T(x, y) = (\sqrt[3]{x}, \sqrt[3]{y})$
- C $T(x_1, x_2, x_3, x_4) = (x_1 + x_2, x_2, x_3 x_4, x_4)$
- D $T(x, y, z) = (x^2, y)$
- E $T(x_1, x_2, x_3, x_4) = (0, (x_2 + x_3)/2, x_1 + x_3)$

Next Question

2. Suppose T is a linear transformation satisfying

$$\begin{aligned} T(1,0,0,0) &= (1,0,2), \\ T(0,1,0,0) &= (-3,1,0), \\ T(0,0,1,0) &= (-2,1,2), \\ T(0,0,0,1) &= (0,-5,7) \end{aligned}$$

Find $T(2,0,-2,1)$.

- A $(2,0,-2)$
- B $(-2,-7,7)$
- C $(-2,0,2)$
- D $(6,-7,7)$
- E $(6,7,-7)$

Next Question

3. The image of the vector (x, y), under a rotation of $3\pi/2$ about the origin is the vector $(3, 4)$. What is (x, y)?

- A $(-3, -4)$
- B $(3, 4)$
- C $(-4, 3)$
- D $(4, -3)$
- E $(3, -4)$

Next Question

4. Consider the linear transformation $T : \mathbf{R}^5 \to \mathbf{R}^4$ defined by $T(x_1, x_2, x_3, x_4, x_5) = (w_1, w_2, w_3, w_4)$ where $w_i = x_i - x_{i+1}$ for $i = 1, 2, 3, 4$. The standard matrix of T is

A $$\begin{pmatrix} -1 & 0 & 0 & 0 \\ 1 & -1 & 0 & 0 \\ 0 & 1 & -1 & 0 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

B $$\begin{pmatrix} 1 & -1 & 0 & 0 & 0 \\ 0 & 1 & -1 & 0 & 0 \\ 0 & 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 1 & -1 \end{pmatrix}$$

C $$\begin{pmatrix} 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 \\ 0 & -1 & 1 & 0 \\ 0 & 0 & -1 & 1 \\ 0 & 0 & 0 & -1 \end{pmatrix}$$

D $$\begin{pmatrix} -1 & 1 & 0 & 0 & 0 \\ 0 & -1 & 1 & 0 & 0 \\ 0 & 0 & -1 & 1 & 0 \\ 0 & 0 & 0 & -1 & 1 \end{pmatrix}$$

E $$\begin{pmatrix} 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

Next Question

5. Let T be a linear transformation satisfying $T(1,0) = (a,b)$, $T(0,1) = (-b,a)$ and $T(2,4) = (-2,6)$ for some numbers a and b. Find the standard matrix of T.

A

$$\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$$

B

$$\begin{pmatrix} 1 & -1 \\ -1 & -1 \end{pmatrix}$$

C

$$\begin{pmatrix} 1 & 1 \\ -1 & 1 \end{pmatrix}$$

D

$$\begin{pmatrix} -1 & -1 \\ 1 & -1 \end{pmatrix}$$

E

$$\begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix}$$

No more questions

RIGHT!

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Wrong...try again

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