UTAustinX UT.5.05x
Linear Algebra - Foundations to Frontiers

Help

sandipan_dey ⌄

Course   Progress   Dates   Discussion   Syllabus   Outline   Iaff routines   Community

🏠 Course / Exam 1 / E1.3 Exam 1

Previous | Next

E1.3.7 Exam Question 7

🔖 Bookmark this page

📅 Calculator

Exam 1 due Oct 31, 2023 09:12 IST   Completed

Question 7

24/24 points (graded)

$$\begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} -1 \\ 1 \\ 2 \end{pmatrix} =$$

1	✔ Answer: 1
-1	✔ Answer: -1
2	✔ Answer: 2

•

(a) $$\begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} -1 \\ 1 \\ 2 \end{pmatrix} = \begin{pmatrix} 1 \\ -1 \\ 2 \end{pmatrix}$$

$$\begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} -1 & 2 \\ 1 & -1 \\ 2 & 0 \end{pmatrix} =$$

1	✔ Answer: 1	-1	✔
-1	✔ Answer: -1	Answer: -1	
2	✔ Answer: 2	2	✔ Answer: 2
		0	✔ Answer: 0

•

(b) $$\begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} -1 & 2 \\ 1 & -1 \\ 2 & 0 \end{pmatrix} = \begin{pmatrix} 1 & -1 \\ -1 & 2 \\ 2 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 2 & 0 & 1 \end{pmatrix} \begin{pmatrix} -1 \\ 1 \\ 2 \end{pmatrix} =$$

-1	✔ Answer: -1
0	✔ Answer: 0
0	✔ Answer: 0

•

(c) $$\begin{pmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 2 & 0 & 1 \end{pmatrix} \begin{pmatrix} -1 \\ 1 \\ 2 \end{pmatrix} = \begin{pmatrix} -1 \\ 0 \\ 0 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 2 & 0 & 1 \end{pmatrix} \begin{pmatrix} -1 & 2 \\ 1 & -1 \\ 2 & 0 \end{pmatrix} =$$

-1	✔ Answer: -1	2	✔ Answer: 2
0	✔ Answer: 0	1	✔ Answer: 1
0	✔ Answer: 0	4	✔ Answer: 4

•

🔲 Calculator

(d) $\begin{pmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 2 & 0 & 1 \end{pmatrix} \begin{pmatrix} -1 & 2 \\ 1 & -1 \\ 2 & 0 \end{pmatrix} = \begin{pmatrix} -1 & 2 \\ 0 & 1 \\ 0 & 4 \end{pmatrix}$

$\begin{pmatrix} -1 \\ 2 \\ 1 \end{pmatrix}^T \begin{pmatrix} 0 \\ -1 \\ 2 \end{pmatrix} =$ [0] ✔ Answer: 0

(e) $\begin{pmatrix} -1 \\ 2 \\ 1 \end{pmatrix}^T \begin{pmatrix} 0 \\ -1 \\ 2 \end{pmatrix} = 0$

$\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}^T \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} =$ [1] ✔ Answer: 1   [0] ✔ Answer: 0
[0] ✔ Answer: 0   [1] ✔ Answer: 1

(f) $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}^T \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

- Is $x = \begin{pmatrix} \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \end{pmatrix}$ a unit vector?

[YES ▾] ✔ Answer: YES

Answer:
True

$$\left\| \begin{pmatrix} \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \end{pmatrix} \right\|_2 = \sqrt{\begin{pmatrix} \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \end{pmatrix}^T \begin{pmatrix} \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \end{pmatrix}} = \sqrt{\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}} = \sqrt{1} = 1.$$
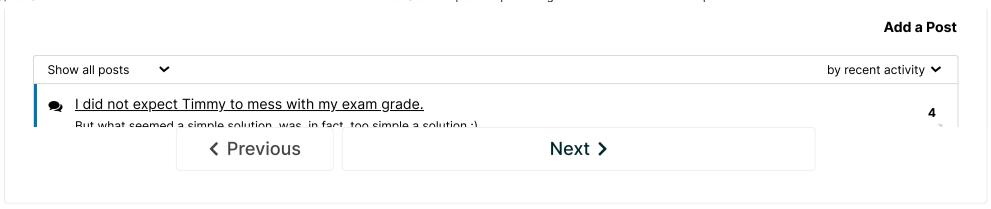
Hence it is a unit vector (a vector of length one).

[Submit]

ⓘ Answers are displayed within the problem

Discussion

Topic: Exam 1 / E1.3.7

Hide Discussion

▦ Calculator

Add a Post

Show all posts ⌄	by recent activity ⌄

💬 <u>I did not expect Timmy to mess with my exam grade.</u>   **4**
But what seemed a simple solution, was, in fact, too simple a solution ;)

‹ Previous	Next ›

![edX]

edX

<u>About</u>

<u>Affiliates</u>

<u>edX for Business</u>

<u>Open edX</u>

<u>Careers</u>

<u>News</u>

Legal

<u>Terms of Service & Honor Code</u>

<u>Privacy Policy</u>

<u>Accessibility Policy</u>

<u>Trademark Policy</u>

<u>Sitemap</u>

<u>Cookie Policy</u>

<u>Your Privacy Choices</u>

Connect

<u>Idea Hub</u>

<u>Contact Us</u>

<u>Help Center</u>

<u>Security</u>

<u>Media Kit</u>

Calculator