Homework Quiz 8

Due 17 Nov at 6:00

Points 130

Questions 13

Available 10 Nov at 6:00 - 17 Nov at 6:00

Time limit None

This guiz was locked 17 Nov at 6:00.

Attempt history

	Attempt	Time	Score
LATEST	Attempt 1	4,982 minutes	130 out of 130

Score for this quiz: 130 out of 130

Submitted 17 Nov at 3:07

This attempt took 4,982 minutes.

Question 1

10 / 10 pts

Let
$$\mathbf{v_1} = \begin{bmatrix} -3 \\ 0 \\ 6 \end{bmatrix}$$
, $\mathbf{v_2} = \begin{bmatrix} -2 \\ 2 \\ 3 \end{bmatrix}$, $\mathbf{v_3} = \begin{bmatrix} 0 \\ -6 \\ 3 \end{bmatrix}$ and $\mathbf{p} = \begin{bmatrix} 1 \\ 14 \\ -9 \end{bmatrix}$.

Determine if \mathbf{p} is in $\operatorname{Col} A$, where $A = [\mathbf{v}_1 \quad \mathbf{v}_2 \quad \mathbf{v}_3]$.

Correct!

- \bigcirc Yes, **p** is in Col A.
- \bigcirc No, \mathbf{p} is not in $\operatorname{Col} A$.

Question 2

10 / 10 pts

With
$$\mathbf{u}=\begin{bmatrix} -2\\3\\1 \end{bmatrix}$$
 and $A=\begin{bmatrix}\mathbf{v}_1 & \mathbf{v}_2 & \mathbf{v}_3\end{bmatrix}$ where $\mathbf{v}_1=\begin{bmatrix} -3\\0\\6 \end{bmatrix}$, $\mathbf{v}_2=\begin{bmatrix} -2\\2\\3 \end{bmatrix}$, $\mathbf{v}_3=\begin{bmatrix} 0\\-6\\3 \end{bmatrix}$, determine if \mathbf{u} is in $\mathrm{Nul}\,A$.

Correct!

- lacksquare Yes, **u** is in $\mathbf{Nul}\ A$.
- \bigcirc No, **u** is not in **Nul** A.

Question 3

10 / 10 pts

Mark all sets of vectors below that form a basis for \mathbb{R}^2 or \mathbb{R}^3 . (Careful here; reread the definition of a basis.)

$$\qquad \left\{ \begin{bmatrix} -4 \\ 6 \end{bmatrix}, \begin{bmatrix} 2 \\ -3 \end{bmatrix} \right\}$$

Correct!

$$\left\{ \begin{bmatrix} 1 \\ -6 \\ -7 \end{bmatrix}, \begin{bmatrix} 3 \\ -4 \\ 7 \end{bmatrix}, \begin{bmatrix} -2 \\ 7 \\ 5 \end{bmatrix}, \begin{bmatrix} 0 \\ 8 \\ 9 \end{bmatrix} \right\}$$

Question 4

10 / 10 pts

Select all the statements that are true.

lacksquare A subset $m{H}$ of \mathbb{R}^n is a subspace if the zero vector is in $m{H}$.



Given vectors $\mathbf{v}_1, \dots, \mathbf{v}_p$ in \mathbb{R}^n , the set of all linear combinations of these vectors is a subspace of \mathbb{R}^n .

Correct!

- lacksquare The null space of an m imes n matrix is a subspace of \mathbb{R}^n .
- lacksquare The column space of a matrix A is the set of solutions of $A\mathbf{x} = \mathbf{b}$.
- If B is an echelon form of matrix A, then the pivot columns of B form a basis for $\operatorname{Col} A$.

Question 5

10 / 10 pts

Suppose that A is a $n \times n$ matrix whose columns are linearly independent. Select all the statements that are true.

Correct!

 \mathbb{Z} Col $A = \mathbb{R}^n$.

Correct!

Correct!

 \square rank $A = n - \dim \operatorname{Nul} A$.

Correct!

 \square rank A = n.

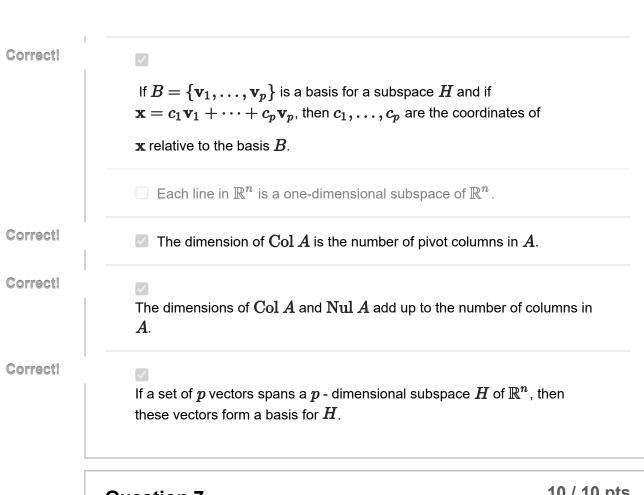
Correct!

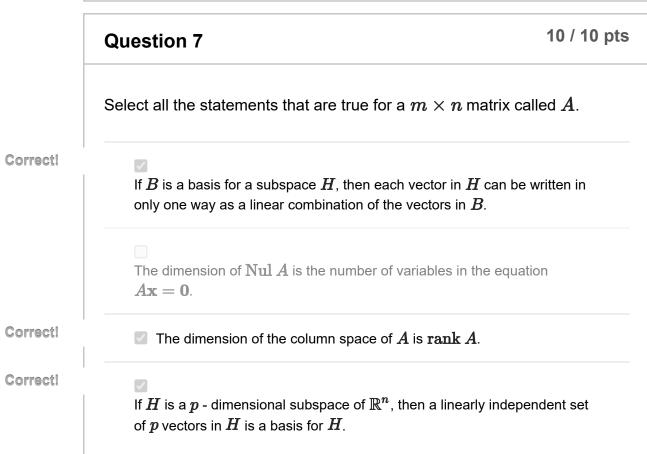
 \square dim Nul A = 0.

Question 6

10 / 10 pts

Select all the statements that are true. Here A is an m imes n matrix.





Let
$$\mathbf{b_1}=egin{bmatrix}1\\-3\\0\end{bmatrix}$$
 , $\mathbf{b_2}=egin{bmatrix}-3\\5\\0\end{bmatrix}$ and $\mathbf{x}=egin{bmatrix}-7\\5\\0\end{bmatrix}$.

The vector ${\bf x}$ is in a subspace H with a basis $B=[\,{f b_1}\,\,\,\,\,\,{f b_2}\,].$ Find the B - coordinate vector of ${\bf x}$.

Correct!

$$left[\mathbf{x}]_B = egin{bmatrix} 5 \ 4 \end{bmatrix}$$

$$igcup \left[\mathbf{x}
ight]_B = \left[egin{matrix} -22 \ 46 \end{matrix}
ight]$$

$$igcirc$$
 $[\mathbf{x}]_B = egin{bmatrix} -7 \ 5 \end{bmatrix}$

The problem does not provide sufficient information to answer this question.

Question 9

10 / 10 pts

If the subspace of all solutions of $A\mathbf{x} = \mathbf{0}$ has a basis consisting of three vectors and if A is a 5×7 matrix, what is the rank of A?

5

7

Correct!

4

2

If the rank of a 9×8 matrix A is 7, what is the dimension of the solution space of $A\mathbf{x} = \mathbf{0}$?

- 9
- 8
- 2

Correct!

1

Question 11

10 / 10 pts

Let
$$A=\begin{bmatrix} 1 & -2 & 9 & 5 & 4 \\ 1 & -1 & 6 & 5 & -3 \\ -2 & 0 & -6 & 1 & -2 \\ 4 & 1 & 9 & 1 & -9 \end{bmatrix}$$
 with row reduced echelon form $U=\begin{bmatrix} 1 & 0 & 3 & 0 & 0 \\ 0 & 1 & -3 & 0 & -7 \\ 0 & 0 & 0 & 1 & -2 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$.

$$U = egin{bmatrix} 1 & 0 & 3 & 0 & 0 \ 0 & 1 & -3 & 0 & -7 \ 0 & 0 & 0 & 1 & -2 \ 0 & 0 & 0 & 0 & 0 \end{bmatrix}.$$

We denote the columns of A by $\mathbf{a}_1, \dots, \mathbf{a}_5$ such that

 $[\mathbf{a}_3 \quad \mathbf{a}_4 \quad \mathbf{a}_5]$ and the columns of U by $[\mathbf{u}_1, \dots, \mathbf{u}_5]$ $A = [\, \mathbf{a}_1 \quad \mathbf{a}_2 \,$ such that $U = [\mathbf{u}_1 \quad \mathbf{u}_2 \quad \mathbf{u}_3 \quad \mathbf{u}_4 \quad \mathbf{u}_5].$

Mark all correct statements below.

 \square A basis for Col A is $\{\mathbf{u}_1, \mathbf{u}_2, \mathbf{u}_4\}$.

Correct!

 \square A basis for Col A is $\{\mathbf{a}_1, \mathbf{a}_2, \mathbf{a}_4\}$.

	$lacksquare$ A basis for $\operatorname{Col} A$ is $\{\mathbf{a}_3, \mathbf{a}_5\}$.			
	$lacksquare$ A basis for $\operatorname{Col} A$ is $\{\mathbf{u}_3,\mathbf{u}_5\}$.			
	$lacksquare$ A basis for $\operatorname{Nul} A$ is $\{\mathbf{a}_3,\mathbf{a}_5\}$.			
	$lacksquare$ A basis for $\mathbf{Nul}\ A$ is $\{\mathbf{u_3},\mathbf{u}_5\}$.			
Correct!	$lacksquare$ The basis for $\mathrm{Nul}\ A$ is something else.			
	Question 12 10 / 10 pt	:S		
	Given the following vectors, $\begin{bmatrix} 1\\-1\\-2\\5 \end{bmatrix}, \begin{bmatrix} 2\\-3\\-1\\6 \end{bmatrix}, \begin{bmatrix} 0\\2\\-6\\8 \end{bmatrix}, \begin{bmatrix} -1\\4\\-7\\7 \end{bmatrix}, \begin{bmatrix} 3\\-8\\9\\-5 \end{bmatrix},$ What is the dimension of the subspace spanned by these vectors? (Remember that subspace dimension and vector dimension are two different concepts.)			
Correct!	2			
orrect Answer	Between 2 and 2			
L				

Question 13 $10 / 10 ext{ pts}$ Consider a matrix A that has reduced echelon form:

$$U = egin{bmatrix} 1 & 4 & 0 \ 0 & 0 & 1 \ 0 & 0 & 0 \end{bmatrix}$$

Which set of vectors forms a basis for the column space of A?

$$\quad \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 4 \\ 0 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

Correct!

The problem does not provide sufficient information to answer this question.

Quiz score: 130 out of 130