Homework Quiz 5

Due 27 Oct at 6:00 **Points** 220 **Questions** 22
Available 20 Oct at 6:00 - 27 Oct at 6:00 **Time limit** None

Instructions

Please keep in mind that in Linear Algebra, definitions are important! Also, a Linear Algebra concept can be described in multiple ways.

If you are not sure what a new term means (homogenous, translation etc) please check its definition from the lecture notes or textbook

This quiz was locked 27 Oct at 6:00.

Attempt history

	Attempt	Time	Score
LATEST	Attempt 1	34 minutes	200 out of 220

Score for this quiz: **200** out of 220
Submitted 27 Oct at 3:45
This attempt took 34 minutes.

Question 1 — 10 / 10 pts

A and **b** are defined as below. Denote the columns of A by a_1, a_2, a_3 .

Is b in the set $\{a_1, a_2, a_3\}$? (not span!)

$$A = \begin{bmatrix} 1 & 0 & -4 \\ 0 & 3 & -2 \\ -2 & 6 & 3 \end{bmatrix}, b = \begin{bmatrix} 4 \\ 1 \\ -4 \end{bmatrix}$$

- yes

Correct!

- (◉) no

Question 2

10 / 10 pts

A and **b** are defined as below. Denote the columns of A by a_1, a_2, a_3.

How many vectors are in the set {a_1, a_2, a_3}? (not span!)

$$A = \begin{bmatrix} 1 & 0 & -4 \\ 0 & 3 & -2 \\ -2 & 6 & 3 \end{bmatrix}, b = \begin{bmatrix} 4 \\ 1 \\ -4 \end{bmatrix}$$

- ( ) 2

Correct!

- (◉) 3
- ( ) 4
- ( ) 1
- ( ) 0

Question 3

10 / 10 pts

A and **b** are defined as below. Denote the columns of A by a_1, a_2, a_3, and set W = Span{a_1, a_2, a_3}.

Is b in W?

$$A = \begin{bmatrix} 1 & 0 & -4 \\ 0 & 3 & -2 \\ -2 & 6 & 3 \end{bmatrix}, b = \begin{bmatrix} 4 \\ 1 \\ -4 \end{bmatrix}$$

Correct!

- (◉) yes
- ( ) no

Question 4

10 / 10 pts

A and **b** are defined as below. Denote the columns of A by a_1, a_2, a_3, and set W = Span{a_1, a_2, a_3}.

How many vectors are in W?

$$A = \begin{bmatrix} 1 & 0 & -4 \\ 0 & 3 & -2 \\ -2 & 6 & 3 \end{bmatrix}, b = \begin{bmatrix} 4 \\ 1 \\ -4 \end{bmatrix}$$

- 0
- 4
- 2
- 3
- 1

Correct!

- infinitely many

Question 5

10 / 10 pts

A and **b** are defined as below. Denote the columns of A by a_1, a_2, a_3, and set W = Span{a_1, a_2, a_3}.

Is a_1 in W?

$$A = \begin{bmatrix} 1 & 0 & -4 \\ 0 & 3 & -2 \\ -2 & 6 & 3 \end{bmatrix}, b = \begin{bmatrix} 4 \\ 1 \\ -4 \end{bmatrix}$$

Correct!

- (●) yes
- ( ) no

Question 6

10 / 10 pts

A is defined as below.

How many rows of A contain a pivot position?

$$A = \begin{bmatrix} 1 & 3 & 0 & 3 \\ -1 & -1 & -1 & 1 \\ 0 & -4 & 2 & -8 \\ 2 & 0 & 3 & -1 \end{bmatrix}$$

- ( ) 4

Correct!

- (●) 3
- ( ) 2
- ( ) 1
- ( ) 0

Question 7

10 / 10 pts

A is defined as below.

Does the equation $Ax = b$ have a solution for each b in R^4?

$$A = \begin{bmatrix} 1 & 3 & 0 & 3 \\ -1 & -1 & -1 & 1 \\ 0 & -4 & 2 & -8 \\ 2 & 0 & 3 & -1 \end{bmatrix}$$

Correct!

- no
- yes

Question 8

10 / 10 pts

A is defined as below.

Can each vector in R^4 be written as a linear combination of the columns of the matrix *A*?

$$A = \begin{bmatrix} 1 & 3 & 0 & 3 \\ -1 & -1 & -1 & 1 \\ 0 & -4 & 2 & -8 \\ 2 & 0 & 3 & -1 \end{bmatrix}$$

- yes

Correct!

- no

Question 9

10 / 10 pts

A is defined as below.

Do the columns of *A* span R^4?

$$A = \begin{bmatrix} 1 & 3 & 0 & 3 \\ -1 & -1 & -1 & 1 \\ 0 & -4 & 2 & -8 \\ 2 & 0 & 3 & -1 \end{bmatrix}$$

- yes

Correct!

- no

Question 10

10 / 10 pts

If x is a nontrivial solution of Ax=0, then every entry in x is nonzero.
Is the statement true or false?

- True
- False

Correct!

Question 11

0 / 10 pts

The equation Ax = b is homogeneous if the zero vector is a solution.

Is the statement true or false?

orrect answer

- True

ou Answered

- False

Question 12

10 / 10 pts

The equation x = x_2u + x_3v with x_2 and x_3 as free variables (and neither u nor v a multiple of the other), describes a plane through the origin.

Is the statement true or false?

Correct!

- True
- False

Question 13

10 / 10 pts

The solution set of $Ax = b$ is always obtained by translating the solution set of $Ax = 0$.

Is the statement true or false?

- True
- False

Correct!

Question 14

10 / 10 pts

If A is 3x3 with three pivot positions, then $Ax = 0$ has a nontrivial solution.

- True
- False

Correct!

Question 15

10 / 10 pts

If A is 3x3 with three pivot positions, then $Ax = b$ has a solution for every b in R^3.

- True
- False

Correct!

Question 16

10 / 10 pts

If *A* is 3x3 with two pivot positions, then *A*x = 0 has a nontrivial solution.

Correct!

- (●) True
- ( ) False

Question 17

10 / 10 pts

If *A* is 3x3 with two pivot positions, then *A*x = b has a solution for every b in R^3.

- ( ) True

Correct!

- (●) False

Question 18

0 / 10 pts

If *A* is 3x2 with two pivot positions, then *A*x = 0 has a nontrivial solution.

ou Answered

- (●) True

orrect answer

- ( ) False

Question 19

10 / 10 pts

If A is 3x2 with two pivot positions, then $Ax = b$ has a solution for every b in R^3.

- True
- False

Correct!

Question 20

10 / 10 pts

If A is 2x4 with two pivot positions, then $Ax = 0$ has a nontrivial solution.

- True
- False

Correct!

Question 21

10 / 10 pts

If A is 2x4 with two pivot positions, then $Ax = b$ has a solution for every b in R^2.

- True
- False

Correct!

Question 22

10 / 10 pts

Consider the system of equations

$x_1 + 2x_2 - 3x_3 = 5$

$2x_1 + x_2 - 3x_3 = 13$

$-x_1 + x_2 = -8$

What is a parametric form of the solution set, and how can we visualize it?

Here c is a free scalar parameter.

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x = [1; 1; 1] + c[7; -1; 0]
This describes a line which passes through the points [7; -1; 0] and [1; 1; 1].

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x = [1; 1; 1] + c[7; -1; 0]
This describes a plane which passes through the origin and the points [7; -1; 0] and [1; 1; 1] .

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x = [7; -1; 0] + c[1; 1; 1]

This describes a plane which passes through the origin and the points [7; -1; 0] and [1; 1; 1] .

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x = [7; -1; 0] + c[1; 1; 1]

This describes a line which passes through the origin and the point [7; -1; 0].

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x = [7; -1; 0] + c[1; 1; 1]

This describes a line which passes through the points [7; -1; 0] and [1; 1; 1].

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x = [7; -1; 0] + c[1; 1; 1]

This describes a line which passes through the origin and the point [1; 1; 1] .

Correct!

x = [7; -1; 0] + c[1; 1; 1]

This describes a line which passes through the points [7; -1; 0] and [8; 0; 1]
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Quiz score: **200** out of 220