

Quiz for Section Exam 2

⚠ This is a preview of the published version of the quiz

Started: Apr 23 at 8:04am

Quiz Instructions

This exam is timed. You have 45 minutes from the time that you start. There are 14 questions total, so do not linger if you have difficulties with one question - you only have about 3 minutes for each one.

Several of the questions ask you to identify which of a given number of statements are true or false. Be sure to write "T" or "F" in the given box (without the quotation marks). Do NOT write "t" or "f" or "true" or "false" or anything like that, just T or F.

Question 1

1 pts

Let A and B be square invertible matrices of the same size.

Which of the following statements are necessarily true?

Write either "T" or "F" in the space provided.

(a) $\det(A + B) = \det(A) + \det(B)$:

(b) $\det(AB) = \det(A)\det(B)$:

(c) $\det(A^T) = \det(A)$:

(d) $\det(A^{-1}) = \det(A)^{-1}$:

Question 2**1 pts**

Let A be a square invertible matrix of size 3×3 . What is $\det(2A)/\det(A)$?

Question 3**1 pts**

Let $V = \mathbb{R}^3$ denote three dimensional Euclidean space, as usual. Let L denote the set consisting of all vectors $x = [x_1, x_2, x_3]$ such that $x_1 - 2x_2 + 3x_3 = c$ for some real number c . For which values of c is L a subspace of V ?

☐ For all c except for $c=0$.

☐ For $c=0$ only.

☐ For all c .

☐ For no values c .

Question 4**1 pts**

The matrix $A = \begin{bmatrix} 1 & -1 & 4 & 0 \\ 0 & 1 & -1 & -1 \\ -1 & -1 & -2 & 1 \end{bmatrix}$ has the RREF $B = \begin{bmatrix} 1 & 0 & 3 & 0 \\ 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$.

Which of the following statements are necessarily true?

Please fill in either "T" or "F" after each statement:

(a) The columns of A span \mathbb{R}^3 .

(b) The columns of A are linearly independent.

(c) The rows of A span \mathbb{R}^4 .

(d) The rows of A are linearly independent.

Question 5

1 pts

Let V denote the linear space of all continuous functions on the interval $[-1, 1]$. This question asks you to identify whether certain subsets of V form subspaces.

Please write "T" or "F" in the blanks provided.

(a) The set of all functions f such that $f(0)=0$ is a subspace.

(b) The set of all functions f such that $f(0)=1$ is a subspace.

(c) The set of all functions f such that $f(1)=0$ is a subspace.

(d) The set of all functions f such that $f(1)=1$ is a subspace.

(e) The set of all functions f such that $\int_{-1}^1 f(x) dx = 0$ is a subspace.

Question 6

1 pts

Let V denote the linear space of all polynomials of degree at most 2.

Which of the following statements are necessarily true?

Please write "T" or "F" in the given box.

(a) The set $\{1, x, x^2\}$ is a basis for V .

(b) The set $\{1+x, x, x^2\}$ is a basis for V .

(c) The set $\{1+x^2, 1-x^2, x^2\}$ is a basis for V .

(d) The set $\{1+x, 2+2x, x^2\}$ is a basis for V .

Question 7

1 pts

Let λ be an eigenvalue of a square matrix A . Which of the following statements are necessarily true?

Fill in each blank with either "T" or "F".

(a) The set V of all vectors x such that $Ax = \lambda x$ forms a vector space.

(b) The matrix A^T also has λ as an eigenvalue.

(c) $\det(A - \lambda I) = 0$.

(d) The matrix A^2 has the eigenvalue λ^2 .

Question 8

1 pts

Let A be a matrix of size $n \times n$ such that $\det(A) \neq 0$.

Which of the following statements are necessarily true?

Please fill in each blank with either "T" or "F".

(a) The rows of A form a basis for \mathbb{R}^n .

(b) The columns of A form a basis for \mathbb{R}^n .

(c) The equation $Ax = b$ has a solution for every vector b in \mathbb{R}^n .

Question 9**1 pts**

Let V be the linear space formed by all 3×3 matrices. This question asks you to identify whether certain given subsets of V form linear subspaces.

Fill in each blank with either "T" or "F" for true or false, respectively.

(a) The set of all upper triangular matrices is a subspace.

(b) The set of all diagonal matrices is a subspace.

(c) The set of every matrix A such that $\det(A) \neq 0$ is a subspace.

(c) The set of every matrix A such that $\det(A) = 0$ is a subspace.

Question 10**1 pts**

Let V denote the linear space formed by all 3×3 matrices. What is the dimension of V ?

Question 11**1 pts**

Let A be a square matrix for which we know that $\|Ax\| = \|x\|$ for every vector x .

Which of the following statements are necessarily true?

Please write either "T" or "F" in the given boxes.

(a) A is invertible.

(b) $\det(A) = 1$.









(c) If λ is an eigenvalue of A, then either $\lambda=1$ or $\lambda=-1$.

Question 12

1 pts

For a 3×3 matrix A, we know that $\det(tI - A) = t^3 - 2t^2 - 3t$. What are the eigenvalues of A?

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Question 13**1 pts**

Specify the determinant of the matrix $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 3 & 1 \\ -1 & 0 & 7 \end{bmatrix}$.

Question 14**1 pts**

Specify the largest eigenvalue of the matrix $A = \begin{bmatrix} 0 & 3 & 0 \\ 0 & 0 & -2 \\ 0 & 0 & 0 \end{bmatrix}$.

Quiz saved at 8:04am

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