1. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4-/2.3.40.pg

Let **S** be a set of *m* vectors in \mathbb{R}^n with m > n. Select the best statement.

- A. The set **S** is linearly independent, as long as it does not include the zero vector.
- B. The set **S** is linearly dependent.
- C. The set S is linearly independent, as long as no vector in S is a scalar multiple of another vector in the set.
- D. The set S is linearly independent.
- E. The set **S** could be either linearly dependent or linearly independent, depending on the case.
- F. none of the above

2. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4-/2.3.41.pg

Let *A* be a matrix with more rows than columns. Select the best statement.

- A. The columns of *A* are linearly independent, as long as no column is a scalar multiple of another column in *A*
- B. The columns of *A* could be either linearly dependent or linearly independent depending on the case.
- C. The columns of A are linearly independent, as long as they does not include the zero vector.
- D. The columns of *A* must be linearly dependent.
- E. The columns of *A* must be linearly independent.
- F. none of the above

3. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4-/2.3.42.pg

Let *A* be a matrix with more columns than rows. Select the best statement.

- A. The columns of *A* are linearly independent, as long as they does not include the zero vector.
- B. The columns of *A* could be either linearly dependent or linearly independent depending on the case.
- C. The columns of A must be linearly dependent.
- D. The columns of *A* are linearly independent, as long as no column is a scalar multiple of another column in *A*
- E. none of the above

4. (1 pt) local/Library/UI/MatrixAlgebra/Euclidean/2.3.43.pg

Let *A* be a matrix with linearly independent columns. Select the best statement.

- A. The equation $A\mathbf{x} = \mathbf{0}$ always has nontrivial solutions.
- B. There is insufficient information to determine if such an equation has nontrivial solutions.
- C. The equation $A\mathbf{x} = \mathbf{0}$ has nontrivial solutions precisely when it has more rows than columns.
- D. The equation $A\mathbf{x} = \mathbf{0}$ never has nontrivial solutions.
- E. The equation $A\mathbf{x} = \mathbf{0}$ has nontrivial solutions precisely when it has more columns than rows.
- F. The equation $A\mathbf{x} = \mathbf{0}$ has nontrivial solutions precisely when it is a square matrix.
- G. none of the above

5. (1 pt) local/Library/UI/MatrixAlgebra/Euclidean/2.3.44.pg

Let *A* be a matrix with linearly independent columns. Select the best statement.

- A. The equation $A\mathbf{x} = \mathbf{b}$ has a solution for all **b** precisely when it has more columns than rows.
- B. The equation $A\mathbf{x} = \mathbf{b}$ always has a solution for all \mathbf{b} .
- C. The equation $A\mathbf{x} = \mathbf{b}$ has a solution for all **b** precisely when it is a square matrix.
- D. The equation $A\mathbf{x} = \mathbf{b}$ never has a solution for all \mathbf{b} .
- E. There is insufficient information to determine if Ax = b has a solution for all b.
- F. The equation $A\mathbf{x} = \mathbf{b}$ has a solution for all **b** precisely when it has more rows than columns.
- G. none of the above

6. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4-/2.3.46.pg

Let $\{u_1, u_2, u_3\}$ be a linearly dependent set of vectors. Select the best statement.

- A. {**u**₁, **u**₂, **u**₃, **u**₄} is a linearly independent set of vectors unless **u**₄ = **0**.
- B. {**u**₁, **u**₂, **u**₃, **u**₄} could be a linearly independent or linearly dependent set of vectors depending on the vectors chosen.
- C. {**u**₁, **u**₂, **u**₃, **u**₄} is always a linearly independent set of vectors.

- D. {**u**₁, **u**₂, **u**₃, **u**₄} is a linearly independent set of vectors unless **u**₄ is a linear combination of other vectors in the set.
- E. {**u**₁, **u**₂, **u**₃, **u**₄} is always a linearly dependent set of vectors.
- F. none of the above

7. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4-/2.3.47.pg

Let $\{u_1, u_2, u_3, u_4\}$ be a linearly independent set of vectors. Select the best statement.

- A. {**u**₁, **u**₂, **u**₃} is never a linearly independent set of vectors.
- B. {**u**₁, **u**₂, **u**₃} could be a linearly independent or linearly dependent set of vectors depending on the vectors chosen.
- C. {**u**₁, **u**₂, **u**₃} is always a linearly independent set of vectors.
- D. none of the above

8. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4-/2.3.49.pg

Let \mathbf{u}_4 be a linear combination of $\{\mathbf{u}_1, \mathbf{u}_2, \mathbf{u}_3\}$. Select the best statement.

- A. {**u**₁, **u**₂, **u**₃, **u**₄} could be a linearly dependent or linearly dependent set of vectors depending on the vectors chosen.
- B. {**u**₁, **u**₂, **u**₃} is a linearly dependent set of vectors unless one of {**u**₁, **u**₂, **u**₃} is the zero vector.
- C. {**u**₁, **u**₂, **u**₃, **u**₄} is always a linearly independent set of vectors.
- D. {**u**₁, **u**₂, **u**₃, **u**₄} is never a linearly independent set of vectors.
- E. {**u**₁, **u**₂, **u**₃} is never a linearly dependent set of vectors.
- F. {**u**₁, **u**₂, **u**₃} could be a linearly dependent or linearly dependent set of vectors depending on the vector space chosen.
- G. none of the above

9. (1 pt) Library/Rochester/setLinearAlgebra9Dependence-/ur_la_9_7.pg

The vectors

 $v = \begin{bmatrix} -1 \\ 0 \\ 3 \end{bmatrix}, u = \begin{bmatrix} -4 \\ -12 \\ 31+k \end{bmatrix}, \text{ and } w = \begin{bmatrix} -3 \\ -7 \\ 16 \end{bmatrix}.$ are linearly independent if and only if $k \neq ___$.

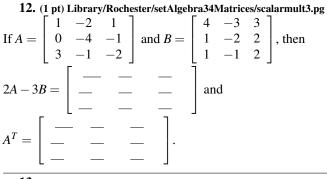
10. (1 pt) Library/TCNJ/TCNJ_LinearIndependence/problem3.pg

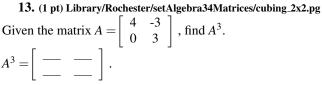
If k is a real number, then the vectors (1,k), (k, 3k+40) are linearly independent precisely when

 $k \neq a, b$, where $a = \underline{\qquad}, b = \underline{\qquad}$, and a < b.

11. (1 pt) Library/Rochester/setLinearAlgebra4InverseMatrix-/ur_la_4_2.pg

The matrix $\begin{bmatrix} 4 & -5 \\ -6 & k \end{bmatrix}$ is invertible if and only if $k \neq$







If *A* and *B* are 6×2 matrices, and *C* is a 4×6 matrix, which of the following are defined?

•	A. $C + B$
•	B. CA
•	C. $B + A$
•	D. B^T
•	E. $B^T C^T$
•	F. AB

15. (1 pt) Library/NAU/setLinearAlgebra/m1.pg Find the inverse of AB if

16. (1 pt) Library/Rochester/setLinearAlgebra4InverseMatrix-/ur_Ch2_1_4.pg

Are the following matrices invertible? Enter "Y" or "N". You must get all of the answers correct to receive credit.

$$\begin{array}{c} -1 \cdot \begin{bmatrix} -5 & 0 \\ 0 & 5 \end{bmatrix} \\ -2 \cdot \begin{bmatrix} 25 & -8 \\ 0 & 0 \end{bmatrix} \\ -3 \cdot \begin{bmatrix} -7 & 6 \\ -1 & -2 \end{bmatrix} \\ -4 \cdot \begin{bmatrix} -5 & -8 \\ 25 & 40 \end{bmatrix}$$

17. (1 pt) Library/ASU-topics/set119MatrixAlgebra/p13.pg Consider the following two systems.

(a)

$$\begin{cases} x - 3y = 2\\ -3x + 3y = -3 \end{cases}$$

(b)

$$\begin{cases} x - 3y = 3\\ -3x + 3y = -3 \end{cases}$$

(i) Find the inverse of the (common) coefficient matrix of the two systems.



(ii) Find the solutions to the two systems by using the inverse, i.e. by evaluating $A^{-1}B$ where B represents the right hand side (i.e. $B = \begin{bmatrix} 2 \\ -3 \end{bmatrix}$ for system (a) and $B = \begin{bmatrix} 3 \\ -3 \end{bmatrix}$ for system (b)). Solution to system (a): x =____, y =____

Solution to system (b): x =_____, y =_____

18. (1 pt) Library/ASU-topics/set119MatrixAlgebra/p13.pg Consider the following two systems. (a)

(b)

$$\begin{cases} -2x+y = -2\\ 3x-y = -2 \end{cases}$$

 $\begin{cases} -2x+y = -3\\ 3x-y = -3 \end{cases}$

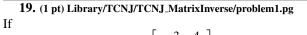
(i) Find the inverse of the (common) coefficient matrix of the two systems.

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$$A^{-1} = \begin{bmatrix} & & & \\ & & & & \\ & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\$$

(ii) Find the solutions to the two systems by using the inverse, i.e. by evaluating $A^{-1}B$ where B represents the right hand side (i.e. $B = \begin{bmatrix} -3 \\ -3 \end{bmatrix}$ for system (a) and $B = \begin{bmatrix} -2 \\ -2 \end{bmatrix}$ for system (b)).

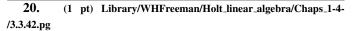
Solution to system (a): x =____, y =____ Solution to system (b): x =____, y =____



$$A = \begin{bmatrix} -3 & 4 \\ 1 & 7 \end{bmatrix},$$

then
$$A^{-1} = \begin{bmatrix} -1 \\ -4 \end{bmatrix}, \text{ solve } A\vec{x} = \vec{b}.$$

$$\vec{x} = \begin{bmatrix} -1 \\ -4 \end{bmatrix}.$$



A must be a square matrix to be invertible. ?

21. (1 pt) Library/Rochester/setLinearAlgebra4InverseMatrix-/ur_la_4_11.pg $\begin{bmatrix} -2e^{2t}\sin(4t) & -2e^{5t}\cos(4t) \\ -6e^{2t}\cos(4t) & 6e^{5t}\sin(4t) \end{bmatrix}$ If A =then $A^{-1} =$



Determine which of the formulas hold for all invertible $n \times n$ matrices A and B

- A. $ABA^{-1} = B$
- B. $(A+B)(A-B) = A^2 B^2$
- C. $A^7 B^6$ is invertible
- D. A + B is invertible
- E. $(I_n A)(I_n + A) = I_n A^2$ F. $(A + A^{-1})^9 = A^9 + A^{-9}$