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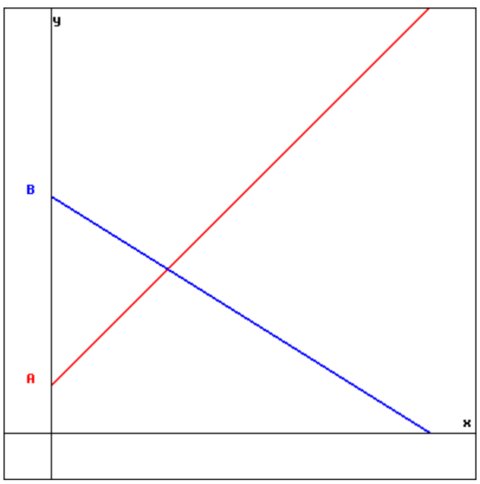
1. **(1 pt) UIOWA.pg**

Use Cramer's rule to find the point of intersection of the lines in the figure, given that line A, in red, has equation $y = x + 1$ and line B, in blue, has equation $2x + 3y = 10$.

x = _____
y = _____



(Click on graph to enlarge)

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2. **(1 pt) local/Library/UI/ur_la_6_25.pg**

Let $A = \begin{bmatrix} -2 & 2 & -1 \\ 1 & 1 & -2 \\ 1 & 2 & 0 \end{bmatrix}$.

Find the following:

(a) $\det(A) =$ _____,

(b) the matrix of cofactors $C = \begin{bmatrix} \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \end{bmatrix}$,

Hint: These are the same cofactors you used to find the determinant. Put these cofactors into the above matrix C.

(c) $\operatorname{adj}(A) = \begin{bmatrix} \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \end{bmatrix}$,

Hint: $Adj(A) = C^T$.

(d) $A^{-1} = \begin{bmatrix} \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \end{bmatrix}$.

Hint: Divide $Adj(A)$ by the determinant.

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3. **(1 pt) local/Library/UI/ur_la_6_26.pg**

Let $A = \begin{bmatrix} -3e^{3t} & 4e^{2t} \\ -6e^{3t} & -3e^{2t} \end{bmatrix}$.

Find the following:

(a) $\det(A) =$ _____,

(b) the matrix of cofactors $C = \begin{bmatrix} \_\_ & \_\_ \\ \_\_ & \_\_ \end{bmatrix}$,

Hint: These are the same cofactors you used to find the determinant. Put these cofactors into the above matrix C.

(c) $\operatorname{adj}(A) = \begin{bmatrix} \_\_ & \_\_ \\ \_\_ & \_\_ \end{bmatrix}$,

Hint: $Adj(A) = C^T$.

(d) $A^{-1} = \begin{bmatrix} \_\_ & \_\_ \\ \_\_ & \_\_ \end{bmatrix}$.

Hint: Divide $Adj(A)$ by the determinant.

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4. **(1 pt) Library/Rochester/setLinearAlgebra4InverseMatrix-/ur_la_4_11.pg**

If $A = \begin{bmatrix} 2e^{2t}\sin(8t) & -2e^{3t}\cos(8t) \\ -5e^{2t}\cos(8t) & -5e^{3t}\sin(8t) \end{bmatrix}$

then $A^{-1} = \begin{bmatrix} \_\_ & \_\_ \\ \_\_ & \_\_ \end{bmatrix}$.

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5. **(1 pt) Library/ASU-topics/set119MatrixAlgebra/p13.pg**

Consider the following two systems.

(a)

$$\begin{cases} -6x + 4y = -3 \\ x - y = 3 \end{cases}$$

(b)

$$\begin{cases} -6x + 4y = 3 \\ x - y = 1 \end{cases}$$

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

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

(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 $B = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$ for system (b)).

Solution to system (a): $x =$ _____ , $y =$ _____

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

6. **(1 pt) Library/NAU/setLinearAlgebra/systemEquivalent.pg**
Determine the following equivalent representations of the following system of equations:

$$7x+7y=0$$

$$-2x+4y=-18$$

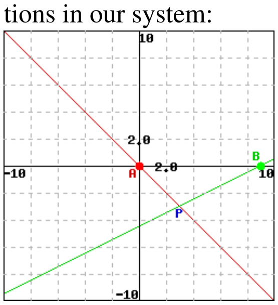
a. Find the augmented matrix of the system.
$$\begin{bmatrix} \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \end{bmatrix}$$

b. Find the matrix form of the system.
$$\begin{bmatrix} \_\_ & \_\_ \\ \_\_ & \_\_ \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} \_\_ \\ \_\_ \end{bmatrix}$$

c. Find a matrix that satisfies the following matrix equation.
$$\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} \_\_ & \_\_ \\ \_\_ & \_\_ \end{bmatrix}\begin{bmatrix} 0 \\ -18 \end{bmatrix}$$

d. Find matrices that satisfy the following matrix equation.
$$x\begin{bmatrix} \_\_ \\ \_\_ \end{bmatrix}+y\begin{bmatrix} \_\_ \\ \_\_ \end{bmatrix}=\begin{bmatrix} \_\_ \\ \_\_ \end{bmatrix}$$

e. The graph below shows the lines determined by the two equations in our system:



Find the coordinates of
P =(___,___)
Find the coordinates of y-intercept of the red line.
A =(0, ___)
Find the coordinates of x-intercept of the green line.
B =(___,0)

7. **(1 pt) Library/Rochester/setLinearAlgebra3Matrices/ur_la_3_15.pg**
Find a and b such that

$$\begin{bmatrix} 9 \\ 12 \\ 2 \end{bmatrix}=a\begin{bmatrix} 1 \\ 4 \\ -1 \end{bmatrix}+b\begin{bmatrix} 4 \\ -8 \\ 7 \end{bmatrix}.$$

$a=$ _____
$b=$ _____

8. **(1 pt) Library/NAU/setLinearAlgebra/HomLinEq.pg**
Solve the equation

$$-8x+6y+5z=0$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix}=s\begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}+t\begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}$$

9. **(1 pt) Library/Rochester/setAlgebra34Matrices/scalarmult3.pg**
If $A=\begin{bmatrix} -2 & 4 & 4 \\ 2 & -2 & -3 \\ -3 & 2 & 4 \end{bmatrix}$ and $B=\begin{bmatrix} 1 & 2 & 0 \\ -4 & -3 & -2 \\ 1 & 2 & 2 \end{bmatrix}$, then

$3A-4B=\begin{bmatrix} \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \end{bmatrix}$ and

$A^T=\begin{bmatrix} \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \end{bmatrix}$.

10. **(1 pt) Library/Rochester/setLinearAlgebra9Dependence-/ur_la_9_3.pg**
Let $A=\begin{bmatrix} -14 \\ 26 \\ 30 \\ 2 \end{bmatrix}$, $B=\begin{bmatrix} 0 \\ -1 \\ -3 \\ 5 \end{bmatrix}$, $C=\begin{bmatrix} -4 \\ 7 \\ 7 \\ 3 \end{bmatrix}$, and $D=\begin{bmatrix} 2 \\ -3 \\ -3 \\ -3 \end{bmatrix}$.

[?] 1. Determine whether or not the four vectors listed above are linearly independent or linearly dependent.

If they are linearly dependent, determine a non-trivial linear relation - (a non-trivial relation is three numbers which are not all three zero.) Otherwise, if the vectors are linearly independent, enter 0's for the coefficients, since that relationship **always** holds.

____$A+$ ____$B+$ ____$C+$ ____$D=0$.

11. **(1 pt) Library/Rochester/setLinearAlgebra10Bases/ur_la_10_26.pg**
Find a basis of the subspace of $\mathbb{R}^4$ defined by the equation $4x_1+5x_2+2x_3-2x_4=0$.

$$\begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}, \begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}, \begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}.$$

12. **(1 pt) Library/Rochester/setLinearAlgebra10Bases/ur_la_10_30.pg**
Find a basis of the column space of the matrix

$$A=\begin{bmatrix} 2 & 4 & 0 & -3 \\ -2 & 3 & -2 & -1 \\ -6 & -5 & -2 & 5 \end{bmatrix}.$$

$$\begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}, \begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}.$$

13. **(1 pt) Library/Rochester/setLinearAlgebra11Eigenvalues-/ur_la_11_1.pg**
Find the characteristic polynomial of the matrix

$A = \begin{bmatrix} -4 & -3 \\ 7 & -2 \end{bmatrix}$.

$p(x) =$ ________.

14. **(1 pt) Library/Rochester/setLinearAlgebra11Eigenvalues-/ur_la_11_7.pg**

The matrix

$C = \begin{bmatrix} 4 & 0 & -9 \\ -18 & -5 & 18 \\ 0 & 0 & -5 \end{bmatrix}$

has two distinct eigenvalues, $\lambda_1 < \lambda_2$:

$\lambda_1 =$ ___ has multiplicity ___. The dimension of the corresponding eigenspace is ___.

$\lambda_2 =$ ___ has multiplicity ___. The dimension of the corresponding eigenspace is ___.

Is the matrix C diagonalizable? (enter YES or NO) ___

15. **(1 pt) Library/Rochester/setLinearAlgebra11Eigenvalues-/ur_la_11_18.pg**

The matrix $A = \begin{bmatrix} -2 & 0 & 0 \\ 0 & -2 & 0 \\ -2 & 0 & -2 \end{bmatrix}$

has one real eigenvalue. Find this eigenvalue and a basis of the eigenspace.

eigenvalue = _____,

Basis: $\begin{bmatrix} \_ \\ \_ \\ \_ \end{bmatrix}$, $\begin{bmatrix} \_ \\ \_ \\ \_ \end{bmatrix}$.

16. **(1 pt) Library/Rochester/setLinearAlgebra11Eigenvalues-/ur_la_11_24.pg**

The matrix $A = \begin{bmatrix} -5 & 0 & 5 & -5 \\ 0 & -5 & -10 & 10 \\ 0 & 0 & 5 & -10 \\ 0 & 0 & 5 & -10 \end{bmatrix}$. has two distinct eigenvalues $\lambda_1 < \lambda_2$. Find the eigenvalues and a basis of each eigenspace.

λ_1= ___,

Basis: $\begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \end{bmatrix}$, $\begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \end{bmatrix}$, $\begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \end{bmatrix}$,

λ_2= ___,

Basis: $\begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \end{bmatrix}$.

17. **(1 pt) Library/Rochester/setLinearAlgebra12Diagonalization-/ur_la_12_1.pg**

Let $M = \begin{bmatrix} 6 & 2 \\ -1 & 9 \end{bmatrix}$.

Find formulas for the entries of M^n, where n is a positive integer.

$M^n = \begin{bmatrix} \_\_\_\_\_ & \_\_\_\_\_ \\ \_\_\_\_\_ & \_\_\_\_\_ \end{bmatrix}$.

18. **(1 pt) Library/Rochester/setLinearAlgebra17DotProductRn-/ur_la_17_2.pg**

Let $x = \begin{bmatrix} 5 \\ 5 \\ -1 \\ 5 \end{bmatrix}$.

Find the norm of x and the unit vector in the direction of x.

$||x|| =$ ________,

$u = \begin{bmatrix} \_\_\_\_\_ \\ \_\_\_\_\_ \\ \_\_\_\_\_ \\ \_\_\_\_\_ \end{bmatrix}$.

19. **(1 pt) Library/Rochester/setLinearAlgebra17DotProductRn-/ur_la_17_6.pg**

Find a vector v perpendicular to the vector $u = \begin{bmatrix} -3 \\ 4 \end{bmatrix}$.

$v = \begin{bmatrix} \_ \\ \_ \end{bmatrix}$.

20. **(1 pt) Library/Rochester/setLinearAlgebra17DotProductRn-/ur_la_17_7.pg**

Find the value of k for which the vectors

$x = \begin{bmatrix} 4 \\ 0 \\ -1 \\ -4 \end{bmatrix}$ and $y = \begin{bmatrix} -3 \\ 1 \\ 3 \\ k \end{bmatrix}$ are orthogonal.

$k =$ _____.

21. **(1 pt) Library/Rochester/setLinearAlgebra18OrthogonalBases-/ur_la_18_7.pg**

Let $A = \begin{bmatrix} -2 & -3 & -4 & 1 \\ 3 & 6 & 6 & -2 \end{bmatrix}$.

Find an orthonormal basis of the kernel of A.

$\begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \end{bmatrix}$, $\begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \end{bmatrix}$.

22. **(1 pt) Library/Rochester/setLinearAlgebra18OrthogonalBases-/ur_la_18_11.pg**

Let $A = \begin{bmatrix} 1 & 0 & 3 \\ -1 & -3 & 3 \\ 3 & 10 & -11 \end{bmatrix}$.

Find an orthonormal basis of the column space of A.

$\begin{bmatrix} \_ \\ \_ \\ \_ \end{bmatrix}$, $\begin{bmatrix} \_ \\ \_ \\ \_ \end{bmatrix}$.

23. **(1 pt) Library/TCNJ/TCNJ_CharacteristicPolynomial-/problem5.pg**

The matrix.

$$A = \begin{bmatrix} 7 & 2 \\ -2 & 3 \end{bmatrix}.$$

has an eigenvalue λ of multiplicity 2 with corresponding eigenvector $\vec{v}$. Find λ and $\vec{v}$.

$\lambda =$ ___ has an eigenvector $\vec{v} = \begin{bmatrix} \_\_ \\ \_\_ \end{bmatrix}$.

24. **(1 pt) Library/TCNJ/TCNJ_Diagonalization/problem4.pg**

Let: $A = \begin{bmatrix} 11 & -9 \\ 18 & -16 \end{bmatrix}$

Find S, D and S^{-1} such that $A = SDS^{-1}$.

$S = \begin{bmatrix} \_\_ & \_\_ \\ \_\_ & \_\_ \end{bmatrix}$, $D = \begin{bmatrix} \_\_ & 0 \\ 0 & \_\_ \end{bmatrix}$, $S^{-1} = \begin{bmatrix} \_\_ & \_\_ \\ \_\_ & \_\_ \end{bmatrix}$
.

25. **(1 pt) Library/TCNJ/TCNJ_OrthogonalSets/problem9.pg**

Given $v = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$, find the coordinates for v in the subspace W spanned by $u_1 = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$ and $u_2 = \begin{bmatrix} -6 \\ 12 \end{bmatrix}$. Note that u_1 and u_2 are orthogonal.

$v =$ ____ $u_1 +$ ____ u_2

26. **(1 pt) Library/TCNJ/TCNJ_VectorEquations/problem3.pg**

Let $A = \begin{bmatrix} -3 & -3 & 0 \\ -1 & -3 & 2 \\ -3 & -4 & 1 \end{bmatrix}$ and $b = \begin{bmatrix} -8 \\ -4 \\ -14 \end{bmatrix}$.

[?] 1. Determine if b is a linear combination of a_1, a_2 and a_3, the columns of the matrix A.

If it is a linear combination, determine a non-trivial linear relation - (a non-trivial relation is three numbers which are not all three zero.) Otherwise, enter 0's for the coefficients.
____ $a_1 +$ ____ $a_2 +$ ____ $a_3 = b$.

27. **(1 pt) Library/Utah/College_Algebra/set12_Matrices_and_Determinants-/1050s12p11.pg**

The determinant of the matrix

$$A = \begin{bmatrix} 3 & 4 & 0 & 5 \\ 2 & -2 & 0 & 0 \\ 0 & 3 & 0 & 0 \\ 8 & -6 & 1 & -8 \end{bmatrix}$$

is ____.

Hint: Find a good row or column and expand by minors.

28. **(1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4-/4.1.77.pg**

The null space for the matrix $\begin{bmatrix} 1 & 7 & -2 & 14 & 0 \\ 3 & 0 & 1 & -2 & 3 \\ 6 & 1 & -1 & 0 & 4 \end{bmatrix}$

is spanA,B where A $= \begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}$ B $= \begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}$

29. **(1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4-/4.2.29a.pg**

Find a basis for the null space of the matrix.

A = $\begin{bmatrix} -3 & -7 \\ 1 & 9 \end{bmatrix}$

Basis for null(A) $= \begin{bmatrix} \_\_ \\ \_\_ \end{bmatrix}$

30. **(1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4-/4.2.32a.pg**

Find a basis for the null space of matrix A.

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

Basis $= \begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \end{bmatrix} \begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}$

31. **(1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4-/holt_01_04_028.pg**

Find the values of the coefficients a, b and c so that the conditions

$$f(0) = 3, \quad f'(0) = 19, \quad \text{and} \quad f''(0) = -9$$

hold for the function

$$f(x) = ae^x + be^{2x} + ce^{-3x}.$$

$a =$ ___
$b =$ ___
$c =$ ___

32. **(1 pt) Library/maCalcDB/setAlgebra34Matrices/det_inv_3x3a.pg**

Given the matrix

$$\begin{bmatrix} 1 & 0 & -5 \\ 0 & -3 & -2 \\ 4 & 0 & -3 \end{bmatrix}$$

(a) its determinant is: ________

(b) does the matrix have an inverse? [?]

33. **(1 pt) Library/NAU/setLinearAlgebra/diag3x3.pg**

Let $A = \begin{bmatrix} 5 & -8 & -12 \\ 4 & -7 & -6 \\ 2 & -2 & -6 \end{bmatrix}$. Find an invertible matrix P and a diagonal matrix D such that $D = P^{-1}AP$.

$P = \begin{bmatrix} \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \end{bmatrix}$ $D = \begin{bmatrix} \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \end{bmatrix}$

34. **(1 pt) local/Library/UI/LinearSystems/diag.pg**

Given that the matrix A has eigenvalue $\lambda_1 = 2$ with corresponding eigenvector $\begin{bmatrix} 4 \\ 2 \end{bmatrix}$ and eigenvalue $\lambda_2 = -8$ with corresponding eigenvector $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$, find A.

$A = \begin{bmatrix} \_\_\_\_ & \_\_\_\_ \\ \_\_\_\_ & \_\_\_\_ \end{bmatrix}$.

35. **(1 pt) local/Library/UI/LinearSystems/ur_la_1_19AxB.pg**

Solve the system

$$\begin{cases} 4x_1 - 5x_2 + 3x_3 + 2x_4 = 0 \\ -x_1 + x_2 + 2x_3 + 3x_4 = 0 \\ 3x_1 - 4x_2 + 5x_3 + 5x_4 = 0 \\ -3x_1 + 3x_2 + 6x_3 + 9x_4 = 0 \end{cases}$$

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = + \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} s + \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} t.$$

Solve the system

$$\begin{cases} 4x_1 - 5x_2 + 3x_3 + 2x_4 = 4 \\ -x_1 + x_2 + 2x_3 + 3x_4 = 2 \\ 3x_1 - 4x_2 + 5x_3 + 5x_4 = 6 \\ -3x_1 + 3x_2 + 6x_3 + 9x_4 = 6 \end{cases}$$

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} + \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} s + \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} t.$$

If the matrix A corresponds to the coefficient matrix for the above system of equations, then given any vector $\vec{b}$, the matrix equation $A\vec{x} = \vec{b}$ will always has an infinite number of solutions.

- A. True
- B. False

36. **(1 pt) local/Library/UI/LinearSystems/ur_la_1_20vv3.pg**

Solve the system

$$\begin{cases} x_1 + 4x_2 - 2x_3 + 4x_5 + 4x_6 = 0 \\ -x_4 + 5x_5 + 3x_6 = 0 \\ x_1 + 4x_2 - 6x_5 + 8x_6 = 0 \end{cases}$$

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{bmatrix} = \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} s + \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} t + \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} u.$$

Solve the system

$$\begin{cases} x_1 + 4x_2 - 2x_3 + 4x_5 + 4x_6 = 0 \\ -x_4 + 5x_5 + 3x_6 = 1 \\ x_1 + 4x_2 - 6x_5 + 8x_6 = 2 \end{cases}$$

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{bmatrix} = \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} + \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} s + \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} t + \begin{bmatrix} \_ \\ \_ \\ \_ \\ \_ \\ \_ \\ \_ \end{bmatrix} u.$$

If the matrix A corresponds to the coefficient matrix for the above system of equations, then given any vector $\vec{b}$, the matrix equation $A\vec{x} = \vec{b}$ will always has an infinite number of solutions.

- A. True
- B. False

37. **(1 pt) Library/NAU/setLinearAlgebra/m1.pg**

Find the inverse of AB if

$A^{-1} = \begin{bmatrix} 2 & -5 \\ 3 & 4 \end{bmatrix}$ and $B^{-1} = \begin{bmatrix} 4 & 0 \\ 4 & -2 \end{bmatrix}$.

$(AB)^{-1} = \begin{bmatrix} \_\_\_ & \_\_\_ \\ \_\_\_ & \_\_\_ \end{bmatrix}$

38. **(1 pt) Library/Rochester/setAlgebra34Matrices/cubing_2x2.pg**

Given the matrix $A = \begin{bmatrix} 3 & -4 \\ 0 & 2 \end{bmatrix}$, find A^3.

$A^3 = \begin{bmatrix} \_ & \_ \\ \_ & \_ \end{bmatrix}$.

39. **(1 pt) local/Library/UI/4.1.77.pg**

The null space for the matrix $\begin{bmatrix} 1 & 7 & -2 & 14 & 0 \\ 3 & 0 & 1 & -2 & 3 \\ 6 & 1 & -1 & 0 & 4 \end{bmatrix}$

is spanA,B where A = $\begin{bmatrix} \_\_\_\_ \\ \_\_\_\_ \\ \_\_\_\_ \\ \_\_\_\_ \\ \_\_\_\_ \end{bmatrix}$ B = $\begin{bmatrix} \_\_\_\_ \\ \_\_\_\_ \\ \_\_\_\_ \\ \_\_\_\_ \\ \_\_\_\_ \end{bmatrix}$

40. **(1 pt) local/Library/UI/4.3.3.pg**

Find bases for the column space and the null space of matrix A. You should verify that the Rank-Nullity Theorem holds. An equivalent echelon form of matrix A is given to make your work easier.

A = $\begin{bmatrix} 1 & 0 & -4 & -3 \\ -2 & 1 & 13 & 5 \\ 0 & 1 & 5 & -1 \end{bmatrix}$ $\begin{bmatrix} 1 & 0 & -4 & -3 \\ 0 & 1 & 5 & -1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

Basis for the column space of A = $\begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}$ $\begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}$

Basis for the null space of A = $\begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}$ $\begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}$

41. **(1 pt) local/Library/UI/6a.pg**

The null space for the matrix $\begin{bmatrix} 2 & 0 & 5 \\ -1 & 6 & 2 \\ 4 & 4 & -1 \\ 5 & 1 & 0 \\ 4 & 1 & 1 \end{bmatrix}$

is $\begin{bmatrix} \_\_\_\_ \\ \_\_\_\_ \\ \_\_\_\_ \end{bmatrix}$

42. **(1 pt) Library/Rochester/setLinearAlgebra23QuadraticForms-/ur_la_23_1.pg**

Write the matrix of the quadratic form
$Q(x) = -4x_1^2 + 2x_2^2 - 6x_3^2 - 5x_1x_2 - 9x_1x_3 - 1x_2x_3$.

$A = \begin{bmatrix} \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \end{bmatrix}$.

43. **(1 pt) Library/Rochester/setLinearAlgebra23QuadraticForms-/ur_la_23_4.pg**

If $A = \begin{bmatrix} 5 & 8 \\ 8 & -9 \end{bmatrix}$ and $Q(x) = x \cdot Ax$,
Then $Q(e_1) =$ ___ and $Q(e_2) =$ ___.

44. **(1 pt) Library/Rochester/setLinearAlgebra23QuadraticForms-/ur_la_23_5.pg**

If $A = \begin{bmatrix} 7 & 9 & 7 \\ 9 & 5 & -9 \\ 7 & -9 & -9 \end{bmatrix}$ and $Q(x) = x \cdot Ax$,
Then $Q(x_1, x_2, x_3) =$ ___ x_1^2+ ___ x_2^2+ ___ x_3^2+ ___ x_1x_2+ ___ x_1x_3+ ___ x_2x_3.