Quizzes

Answer each question neatly on the line provided.

 Name:
 ID:

 Quiz 1
 ID:

 1. (5 points) Solve the system $\begin{cases} 4x + 3y = 2\\ 7x + 5y = 3 \end{cases}$

 1.
 ID:

2. (5 points) Solve the system
$$\begin{cases} x+y-z &= 0\\ 4x-y+5z &= 0\\ 6x+y+4z &= 0 \end{cases}$$

2. _____

3. (5 points) Solve the system $\begin{cases} x - 2y &= 3\\ 2x - 4y &= 8 \end{cases}$ Represent your solution graphically.

1. (5 points) For which values of k does the system $\begin{cases} x + 2y + 3z = 0 \\ x + 3y + 8z = 0 \\ x + 2y + 2z = k \end{cases}$ have infinitely many solutions.

2. (5 points) Find all solutions of
$$\begin{cases} x+y = 1\\ 2x-y = 5\\ 3x+4y = 2 \end{cases}$$

2.	

3. (5 points) Find all solutions of
$$\begin{cases} x_1 + 2x_3 + 4x_4 &= -8\\ x_2 - 3x_3 - x_4 &= 6\\ 3x_1 + 4x_2 - 6x_3 + 8x_4 &= 0\\ -x_2 + 3x_3 + 4x_4 &= -12 \end{cases}$$

3.	
-	

1. (5 points) (True/False) A linear system with more unknowns than equations must have infitely many solutions or none.

1. _____

2. (5 points) (True/False) The rank of
$$\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 3 & 5 \end{bmatrix}$$
 is 3.

2. _____

3. (5 points) Describe the linear transformation $T(\vec{x}) = \begin{bmatrix} 0 & 1 \\ 0 & -1 \end{bmatrix} \vec{x}$ geometrically. (HINT: It may be helpful to draw the image of the "L" shape as is done in our textbook).

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1. (5 points) Find
$$A^4$$
 when $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$.

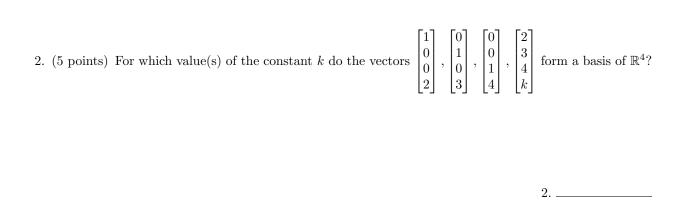
2. (5 points) Decide if the matrix
$$A = \begin{bmatrix} 1 & 0 & 10 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$
 is invertible. If it is find its inverse.

2. _____

1._____

3. (5 points) (True/False) There is a matrix A so that $A \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix}$.

1. (5 points) If
$$\vec{x} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$
 is in the span V of the vectors $\vec{v}_1 = \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}$, $\vec{v}_2 = \begin{bmatrix} 1 \\ 3 \\ 4 \end{bmatrix}$, $\vec{v}_3 = \begin{bmatrix} 1 \\ 4 \\ 8 \end{bmatrix}$, find the coordinates of \vec{x} with respect to the basis of V determined by $\vec{v}_1, \vec{v}_2, \vec{v}_3$. If \vec{x} is not in V write, "not in V".



3. (5 points) Consider a linear transformation from T from \mathbb{R}^5 to \mathbb{R}^3 . What are the possible values of nullity of T.

3. _____

1. (5 points) Find the matrix *B* of the linear transformation $T(x) = Ax = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ with respect to the basis $\vec{v}_1 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}, \vec{v}_2 = \begin{bmatrix} 1 \\ -1 \end{bmatrix}.$

1. _____

2. (5 points) Find a basis of the plane \mathbb{R}^2 so that the matrix B of the mirror reflection T of \mathbb{R}^2 over the line spanned by $\begin{bmatrix} 1 \\ -1 \end{bmatrix}$ is a diagonal matrix.

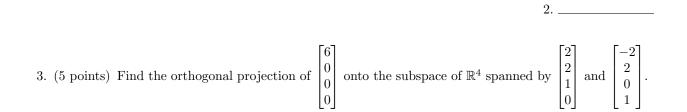
2._____

3. (5 points) Find a basis for the space of all diagonal 2×2 matrices.

1. (5 points) (True/False) The vectors $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $\begin{bmatrix} 2 & 3 \\ 5 & 6 \end{bmatrix}$, $\begin{bmatrix} 1 & 4 \\ 6 & 8 \end{bmatrix}$ are linearly independent.

1. _____

2. (5 points) Find the matrix B of the linear transformation T(f) = 3f' - 4f from P_2 to P_2 with respect to the basis $\mathfrak{U} = (1, t, t^2)$.



1. (5 points) Find the least squares solution to the system Ax = b when $A = \begin{bmatrix} 1 & 1 \\ 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $b = \begin{bmatrix} -6 \\ -6 \\ -6 \end{bmatrix}$.

1. _____

2. _____

2. (5 points) Find the best fit linear function of the form $f(t) = c_0 + c_1 t$ to the data points (0, -2), (1, -2), (1, -6) using least squares.

3. (5 points) Evaluate det A when
$$A = \begin{bmatrix} 10 & 20 & 30 \\ 4 & 5 & 6 \\ 7 & 8 & 10 \end{bmatrix}$$
.

1. (5 points) Find an eigenvector of
$$A = \begin{bmatrix} -6 & 6 \\ -15 & 13 \end{bmatrix}$$
 with corresponding eigenvalue 4.

2. (5 points) Find the eigenvalue of
$$A = \begin{bmatrix} 2 & 0 \\ 3 & 4 \end{bmatrix}$$
 associated to the eigenvector $\begin{bmatrix} 2 \\ -3 \end{bmatrix}$.

3. (5 points) Find the classical adjoint of
$$A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 2 & 0 & 1 \end{bmatrix}$$
.

3. _____

1. _____

1. (5 points) Find all real eigenvalues of $A = \begin{bmatrix} 4 & 5 \\ -2 & -2 \end{bmatrix}$ with their multiplicities

2. (5 points) Find all real eigenvalues of
$$A = \begin{bmatrix} 2 & 0 & 0 & 0 \\ 2 & 1 & 0 & 0 \\ 2 & 1 & 3 & 0 \\ 2 & 1 & 2 & 2 \end{bmatrix}$$
 with their multiplicities

2. _____

3. (5 points) Find an eigenbasis of $A = \begin{bmatrix} 6 & 3 \\ 2 & 7 \end{bmatrix}$. Write NONE on the answerline if there is no eigenbasis.