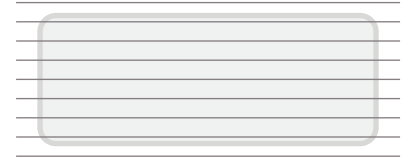




Test 1

Name _____ Uni _____



[1] By least squares, find the equation of the form $y = ax + b$ that best fits the data

$$\begin{bmatrix} x_1 & y_1 \\ x_2 & y_2 \\ x_3 & y_3 \\ x_4 & y_4 \end{bmatrix} = \begin{bmatrix} -1 & 1 \\ 0 & 0 \\ 1 & 0 \\ 3 & 0 \end{bmatrix}$$

$$y = \boxed{} x + \boxed{}$$



Test 1

[2] Find the inverse of the matrix

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

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

(Do not write a negative denominator.)



Test 1

[3] Consider \mathbb{R}^3 equipped with the inner product

$$\langle (a, b, c), (d, e, f) \rangle = [a \ b \ c] \begin{bmatrix} 1 & 1 & 0 \\ 1 & 2 & 1 \\ 0 & 1 & 2 \end{bmatrix} \begin{bmatrix} d \\ e \\ f \end{bmatrix}$$

Using this inner product, find the orthogonal projection of the vector $(2, 2, 2)$ onto the plane spanned by $(1, 0, 1)$ and $(0, 1, 1)$.

[<input type="text"/> <input type="text"/> <input type="text"/>]
--



Test 1

[4] Let $f(n)$ be the determinant of the $n \times n$ matrix in the sequence

$$\begin{bmatrix} 1 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 \\ 3 & 1 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & 0 \\ 3 & 1 & -1 \\ 0 & 3 & 1 \end{bmatrix} \quad \begin{bmatrix} 1 & -1 & 0 & 0 \\ 3 & 1 & -1 & 0 \\ 0 & 3 & 1 & -1 \\ 0 & 0 & 3 & 1 \end{bmatrix}$$

Find $f(1)$ and $f(2)$. Find a recurrence relation for $f(n)$. Find $f(6)$.

$f(1) = $	<input type="text"/>	$f(2) = $	<input type="text"/>	
$f(n) = $	<input type="text"/>	$f(n-1) + $	<input type="text"/>	$f(n-2)$
$f(6) = $	<input type="text"/>			



Test 1

[5] Find a system of eigenvalues and eigenvectors for the matrix A , where

$$A = \begin{bmatrix} 5 & -2 \\ 1 & 2 \end{bmatrix}$$

$$\lambda_1, \lambda_2 = \boxed{}, \boxed{}$$
$$v_1, v_2 = \begin{bmatrix} \boxed{} \\ \boxed{} \end{bmatrix}, \begin{bmatrix} \boxed{} \\ \boxed{} \end{bmatrix}$$