F16 10:10 Final Exam Problem 1
Linear Algebra, Dave Bayer

test1b3p1

[Reserved for Score]

Test 1

Name ____________________ Uni ____________

[1] Find the intersection of the following two affine subspaces of $\mathbb{R}^3$.

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} + \begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix} s \qquad \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix} t$$

$$\boxed{\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \qquad\qquad}$$

F16 10:10 Final Exam Problem 2
Linear Algebra, Dave Bayer

test1b3p2

[Reserved for Score]

Test 1

[2] Find the inverse to the matrix

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

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

Test 1

[3] Find A^n where A is the matrix

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

$$A^n = \frac{\square}{\square}\begin{bmatrix} \square & \square \\ \square & \square \end{bmatrix} + \frac{\square}{\square}\begin{bmatrix} \square & \square \\ \square & \square \end{bmatrix}$$

F16 10:10 Final Exam Problem 4
Linear Algebra, Dave Bayer

test1b3p4

[Reserved for Score]

Test 1

[4] Find A^n where A is the matrix

$$A = \begin{bmatrix} 3 & 1 \\ -1 & 5 \end{bmatrix}$$

$$\boxed{A^n = \frac{\square}{\square} \begin{bmatrix} \square & \square \\ \square & \square \end{bmatrix} + \frac{\square}{\square} \begin{bmatrix} \square & \square \\ \square & \square \end{bmatrix}}$$

test1b3p5

[Reserved for Score]

Test 1

[5] Find A^n where A is the matrix

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

$$A^n = \frac{\boxed{}}{\boxed{}} \begin{bmatrix} \boxed{} & \boxed{} & \boxed{} \\ \boxed{} & \boxed{} & \boxed{} \\ \boxed{} & \boxed{} & \boxed{} \end{bmatrix} + \frac{\boxed{}}{\boxed{}} \begin{bmatrix} \boxed{} & \boxed{} & \boxed{} \\ \boxed{} & \boxed{} & \boxed{} \\ \boxed{} & \boxed{} & \boxed{} \end{bmatrix} + \frac{\boxed{}}{\boxed{}} \begin{bmatrix} \boxed{} & \boxed{} & \boxed{} \\ \boxed{} & \boxed{} & \boxed{} \\ \boxed{} & \boxed{} & \boxed{} \end{bmatrix}$$

F16 10:10 Final Exam Problem 6
Linear Algebra, Dave Bayer

test1b3p6

[Reserved for Score]

Test 1

[6] Find e^{At} where A is the matrix

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

$$e^{At} = \frac{\square}{\square}\begin{bmatrix} \square & \square & \square \\ \square & \square & \square \\ \square & \square & \square \end{bmatrix} + \frac{\square}{\square}\begin{bmatrix} \square & \square & \square \\ \square & \square & \square \\ \square & \square & \square \end{bmatrix} + \frac{\square}{\square}\begin{bmatrix} \square & \square & \square \\ \square & \square & \square \\ \square & \square & \square \end{bmatrix}$$

F16 10:10 Final Exam Problem 7
Linear Algebra, Dave Bayer

test1b3p7

[Reserved for Score]

Test 1

[7] Solve the differential equation $y' = Ay$ where

$$A \;=\; \begin{bmatrix} 1 & -2 & -2 \\ -1 & 3 & 2 \\ 1 & -2 & -1 \end{bmatrix}, \qquad y(0) \;=\; \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$$

$$\boxed{\; y \;=\; \frac{\square}{\square}\begin{bmatrix} \square \\ \square \\ \square \end{bmatrix} + \frac{\square}{\square}\begin{bmatrix} \square \\ \square \\ \square \end{bmatrix} + \frac{\square}{\square}\begin{bmatrix} \square \\ \square \\ \square \end{bmatrix} \;}$$

test1b3p8

[Reserved for Score]

Test 1

[8] Express the quadratic form

$$x^2 - 2xy + 2y^2 + 2xz + 2z^2$$

as a sum of squares of orthogonal linear forms.

$$\boxed{\square \left(\square \right)^2 + \square \left(\square \right)^2 + \square \left(\square \right)^2}$$