Quiz 6 Class 19

Linear Algebra I

Section:

NAME & ID(Please print legibly)

Week 7

PLEASE SHOW ALL YOUR WORK.

1. Let $E = \{u_1, u_2, u_3\}$ and $F = \{b_1, b_2\}$, where

$$u_1 = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}, u_2 = \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}, u_3 = \begin{bmatrix} -1 \\ 1 \\ 1 \end{bmatrix}$$

and

$$b_1 = \begin{bmatrix} 1 \\ -1 \end{bmatrix}, b_2 = \begin{bmatrix} 2 \\ -1 \end{bmatrix}.$$

For the following linear transformation T from $\mathbb{R}^3$ to $\mathbb{R}^2$, find the matrix representing T with respect to the ordered bases E and F:

$$T\left(\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}\right) = \begin{bmatrix} x_1 + x_2 \\ x_1 - x_3 \end{bmatrix}.$$

2. What 3 by 3 matrix represents the transformation that rotates the x-y plane , then x-z plane, then y-z plane, through 180°?