Math 3120, Linear Algebra, Spring 2026, Worksheet 3

February 11, 2026

Name _____

Suppose we are given a matrix A and perform a sequence of elementary row operations described by the following matrices (applied in order: first E_1, then E_2, then E_3):

$$E_1 = \begin{bmatrix} 1 & 0 \\ -2 & 1 \end{bmatrix} \quad E_2 = \begin{bmatrix} 1 & 0 \\ 0 & -1/5 \end{bmatrix} \quad E_3 = \begin{bmatrix} 1 & -2 \\ 0 & 1 \end{bmatrix}$$

This sequence transforms the matrix A into the identity matrix $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

1. Knowing this, solve for x in the equation $Ax = \begin{bmatrix} 0 \\ -2 \end{bmatrix}$

2. What are the inverses of the matrices E_1, E_2, E_3?

3. How would we express A as a product of elementary matrices? Don't actually compute the product, just write down the list of elementary matrices and how they would be multiplied in order to get A.