Elementary Matrices Name_____

Any matric that perform a single row operation.

Multiply a row by a nonzero number

Interchange two rows.

Add a multiple of one row to another.

1. Write the matrix A as a product of elementary matrices.

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

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

2. Solve the given matrix equation using an inverse matrix

$$\begin{bmatrix} 1 & 1 & 1 \\ 2 & 0 & 1 \\ 1 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \\ 3 \end{bmatrix}$$

3. Factor the given matrix into a product of an upper and a lower triangular matrices.

a. $\mathbf{A} = \begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix}$

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

4. Use forward and backward substitution to solve the given system

$$\begin{cases} x + 2y = 3 \\ x + y = 2 \\ x + z = 2 \end{cases}$$