

## Step-1

$$I = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

Consider

$E_{21}$  subtract 5 times row 1 from row 2.

$$\text{Therefore } E_{21} = \begin{pmatrix} 1 & 0 & 0 \\ -5 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$E_{32}$  subtract -7 times row 2 from row 3.

$$\text{Therefore } E_{32} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 7 & 1 \end{pmatrix}$$

## Step-2

So applying  $E_{21}$  subtracts 5 times row 1 from row 2 on column  $b = (1, 0, 0)$  gives the column  $(1, 0 - 5(1), 0) = (1, -5, 0)$

Applying  $E_{32}$  subtracts -7 times row 2 from row 3 on column  $(1, -5, 0)$  gives

$$(1, -5, 0 - (-7)(-5)) = (1, -5, -35)$$

Hence  $\boxed{E_{32}E_{21}b = (1, -5, -35)}$

## Step-3

Applying  $E_{32}$  subtracts -7 times row 2 from row 3 on column  $b = (1, 0, 0)$  gives

$$(1, 0, 0 - 0(-7)) = (1, 0, 0)$$

Applying  $E_{21}$  subtracts 5 times row 1 from row 2 on column  $(1, 0, 0)$  gives

$$(1, 0 - 5(1), 0) = (1, -5, 0)$$

Hence  $\boxed{E_{21}E_{32}b = (1, -5, 0)}$

Hence row 3 feels no effect from row 1.