1)

$x_1 - x_2 = -150$

$x_2 - x_3 = 240$

$x_3 - x_4 = -100$

$x_4 - x_5 = 80$

$x_5 - x_6 = -160$

$x_6 - x_1 = 90$

so

$$\begin{bmatrix} 1 & -1 & 0 & 0 & 0 & 0 \\ 0 & 1 & -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 0 & 1 & -1 \\ -1 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{bmatrix} = \begin{bmatrix} -150 \\ 240 \\ -100 \\ 80 \\ -160 \\ 90 \end{bmatrix}$$

2

$$\left[\begin{array}{cccccc|c} 1 & 0 & 0 & 0 & 0 & -1 & -90 \\ 0 & 1 & 0 & 0 & 0 & -1 & 60 \\ 0 & 0 & 1 & 0 & 0 & -1 & -180 \\ 0 & 0 & 0 & 1 & 0 & -1 & -80 \\ 0 & 0 & 0 & 0 & 1 & -1 & -160 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

3)

$x_1 - x_6 = -90$

$x_2 - x_6 = 60$

$x_3 - x_6 = -180$ ← lowest value so for all to be positive, $x_3 \geq 0$

$x_4 - x_6 = -80$

$x_5 - x_6 = -160$

$x_6 =$ No value

so

min flow =

$x_3 = 0$

$x_6 = 180$

$x_1 = 90$

$x_2 = 240$

$x_4 = 100$

$x_5 = 20$

$x_1 = 90 \quad x_2 = 240 \quad x_3 = 0$

$x_4 = 100 \quad x_5 = 20 \quad x_6 = 180$