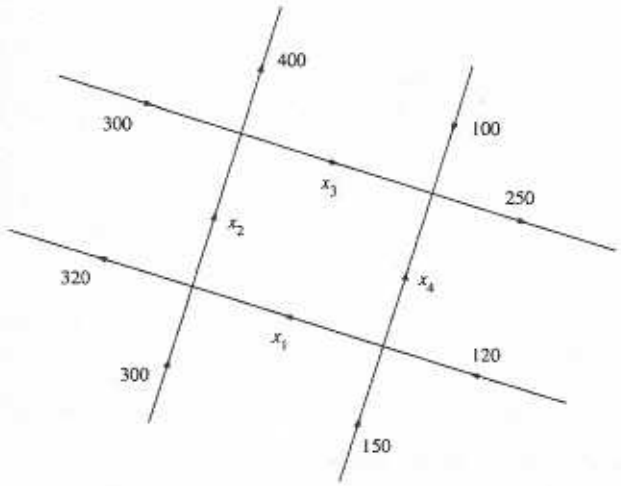
42. Let $x_1, x_2, x_3$, and $x_4$ be the traffic volume at the four locations indicated below.




We are told that the number of cars coming into each intersection is the same as the number of cars coming out:

$$\left|\begin{array}{r} x_1 + 300 = 320 + x_2 \\ x_2 + 300 = 400 + x_3 \\ x_3 + x_4 + 100 = 250 \\ 150 + 120 = x_1 + x_4 \end{array}\right| \text{ or } \left|\begin{array}{rcrcrcrcl} x_1 & - & x_2 & & & & & = & 20 \\ & & x_2 & - & x_3 & & & = & 100 \\ & & & & x_3 & + & x_4 & = & 150 \\ x_1 & & & & & + & x_4 & = & 270 \end{array}\right|$$

The solutions are of the form $\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 270 - t \\ 250 - t \\ 150 - t \\ t \end{bmatrix}$.

Since the $x_i$ must be positive integers (or zero), $t$ must be an integer with $0 \le t \le 150$.
The lowest possible values are $x_1 = 120$, $x_2 = 100$, $x_3 = 0$, and $x_4 = 0$, while the highest possible values are $x_1 = 270$, $x_2 = 250$, $x_3 = 150$, and $x_4 = 150$.