MATH 100—HOMEWORK 03

NAME _____

Directions: please print this page, and put your solutions in the space provided.
If you need extra space, you can attach another sheet of paper.

1. Consider the following linear system.

$$
\begin{aligned}
x_2 + 3x_3 + 5x_4 + x_5 &= 0 \\
x_1 - 2x_2 - 8x_3 - 9x_4 - 2x_5 &= 0 \\
3x_2 + 9x_3 + 15x_4 + 4x_5 &= 0 \\
x_1 \qquad - 2x_3 + x_4 \qquad &= 0
\end{aligned}
$$

(a) Solve the system, and write your answer in **parametric vector form**. *Make sure to show all work.*

(b) Describe the solution set geometrically: is it a point, a line, a plane,...? Why?

2. The traffic, in cars per minute, for a certain freeway network is given below.

200

x_1 x_2

x_3

40 100

x_4 x_5

60
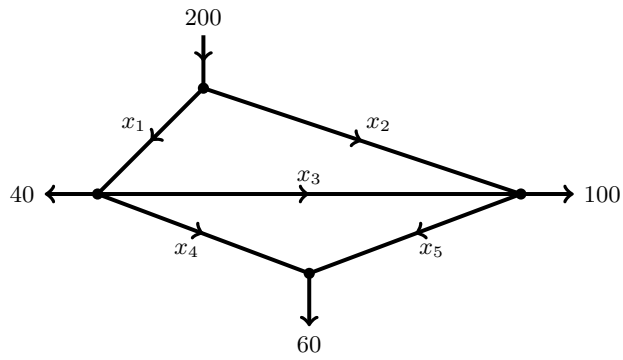
(a) Determine the general flow pattern.

(b) What is the smallest possible value for x_4? Why?

(c) What is the largest possible value for x_5? Why?

(d) Suppose that $x_3 = 20$ and $x_5 = 30$. Determine the values for the remaining roads.