

Practice #1

1. **Traffic flow.** For this problem, refer to Figure 1. What is the flow of traffic along routes x_1 , x_2 and x_3 ? Provide the most general answer that you can.

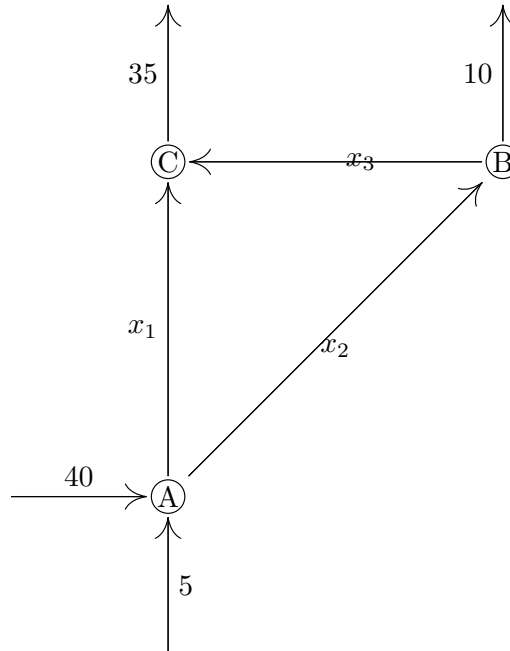
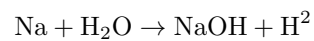


Figure 1: Figure used Problem 1

2. **Chemical reactions** Sodium and water react to form sodium hydroxide (lye) and hydrogen. Balance the chemical equation



3. A linear system in echelon form has 5 equations and 7 unknowns. How many free variables does the system have?

4. Is the following linear system "consistent"? Or "inconsistent"?

$$\begin{aligned}x_1 &= -1 \\x_2 &= 3\end{aligned}\tag{1}$$

5. Are all systems with more equations than unknowns "inconsistent"? Consider the following example :

$$\begin{aligned}2x_1 &= 1 \\4x_1 &= 2\end{aligned}\tag{2}$$