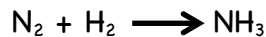


## Balancing Equations

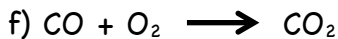
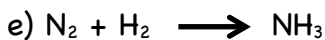
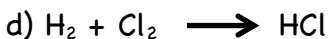
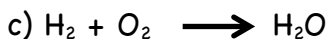
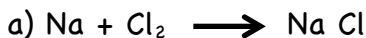
1. Why is the following equation not balanced?



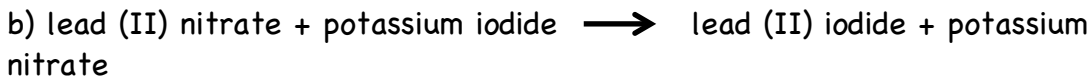
2. The following is an attempt to balance the above equation. What is wrong with the way the equation is balanced?



3. Balance the following equations.



4. For each of the following, write the correct skeleton equation, and then balance it to form a chemical equation.



e) hydrogen sulfide  $\longrightarrow$  hydrogen + sulfur

4. Imagine that you are an engineer trying to determine how much air had to be supplied to burn gasoline in a car engine. Assuming that the gasoline is heptane ( $C_7H_{16}$ ), the word equation is

heptane + oxygen  $\longrightarrow$  carbon dioxide + water vapour

- a) Write the skeleton equation for the reaction.
- b) Balance the equation by adding coefficients as necessary.
- c) How many molecules of oxygen are required for every molecule of heptane that burns?

5. Nitrogen oxides are a group of air pollutants produced by internal combustion engines in automobiles. These pollutants are formed by the reaction of atmospheric nitrogen ( $N_2$ ) and oxygen ( $O_2$ ) to form various combinations including NO,  $NO_2$ ,  $N_2O_4$ ,  $N_2O_3$ , and  $N_2O_5$ . Write balanced chemical equations to represent the production of each of these substances.