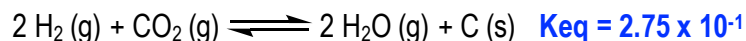
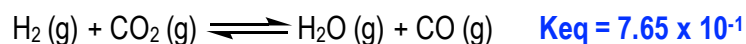


### CONCEPT: CALCULATING K FOR OVERALL REACTION

- Recall: many reactions cannot be carried out in \_\_\_\_ step, but instead require \_\_\_\_\_ steps to get the final product.
  - **Keq** of the overall reaction is the \_\_\_\_\_ of **Keq** values of these multiple steps.

**EXAMPLE:** Calculate the equilibrium constant for the overall reaction:  $\text{C (s)} + \text{CO}_2 \text{ (g)} \rightleftharpoons 2 \text{ CO (g)}$  **Keq = ?** given the following partial reactions:



**STEP 1:** Start with the first compound in the overall reaction and **locate** it in the set of partial reactions.

- Compound from partial reaction must match ( \_\_\_\_\_ , \_\_\_\_\_ ) with the one from the overall equation.
  - This may require you to reverse, multiply or divide the partial reaction, which will also affect **Keq**.

**STEP 2:** Keep moving onto the next compound in the overall reaction until you **locate** all compounds in partial reactions.

- skip compound found in multiple reactions

**STEP 3:** Combine the partial reactions and **cross out** reaction intermediates if present.

- **Reaction Intermediates:** Compounds that look the same, with one as a reactant and the other a product.

**STEP 4:** **Multiply** all the **Keq** values to obtain **Keq** of the overall reaction.

**CONCEPT: CALCULATING K FOR OVERALL REACTION**

**PRACTICE:** Calculate  $K_c$  for:  $C(s) + \frac{1}{2} O_2(g) + H_2(g) \rightleftharpoons \frac{1}{2} CH_3OH(g) + \frac{1}{2} CO(g)$   $K_c = ?$

Given the following reactions:

