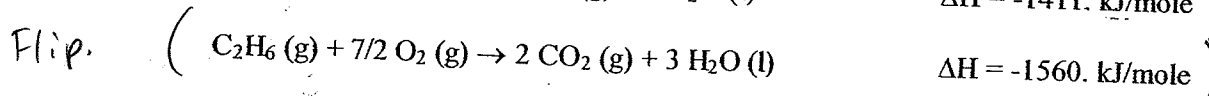
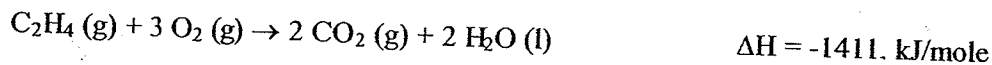


Hess's Law Practice

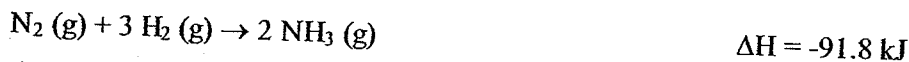
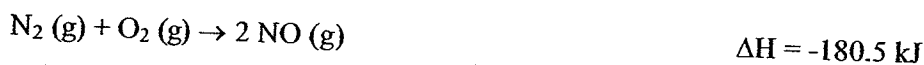
Name KEY
Date _____ Period _____

1. Calculate ΔH for the reaction $C_2H_4(g) + H_2(g) \rightarrow C_2H_6(g)$, from the following data.



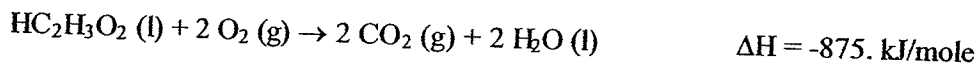
$$= -136.8 \frac{\text{kJ}}{\text{mol}}$$

2. Calculate ΔH for the reaction $4 NH_3(g) + 5 O_2(g) \rightarrow 4 NO(g) + 6 H_2O(g)$, from the following data.



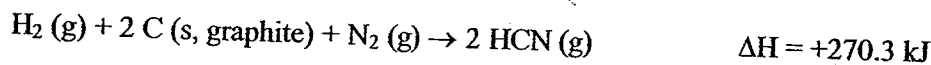
$$-1628 \frac{\text{kJ}}{\text{mol}}$$

3. Find ΔH_f° for acetic acid, $HC_2H_3O_2$, using the following thermochemical data.



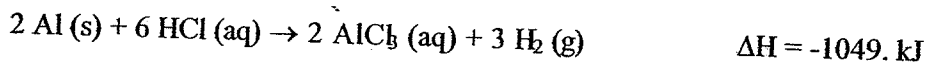
$$-485.62 \frac{\text{kJ}}{\text{mol}}$$

4. Calculate ΔH for the reaction $CH_4(g) + NH_3(g) \rightarrow HCN(g) + 3 H_2(g)$, from the reactions.



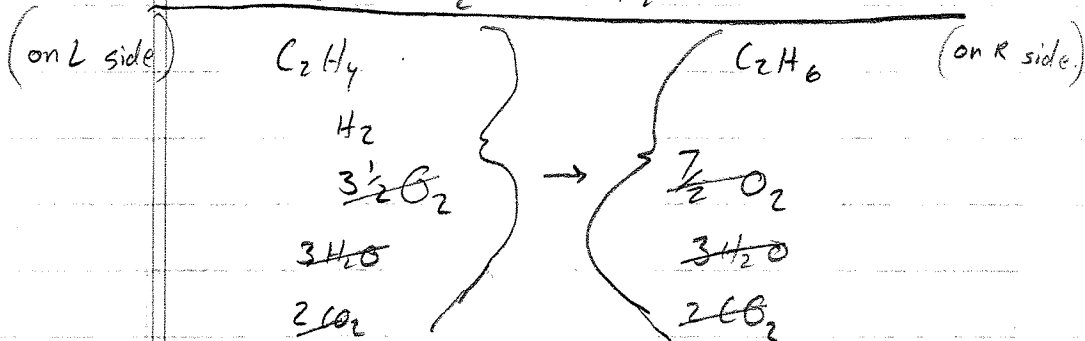
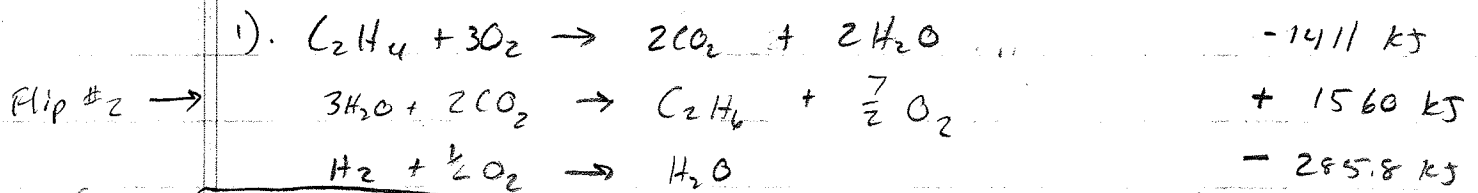
$$255.95 \frac{\text{kJ}}{\text{mol}}$$

5. Calculate ΔH for the reaction $2 Al(s) + 3 Cl_2(g) \rightarrow 2 AlCl_3(s)$ from the following data.

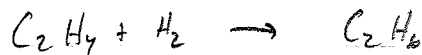


$$-6709.6 \frac{\text{kJ}}{\text{mol}}$$

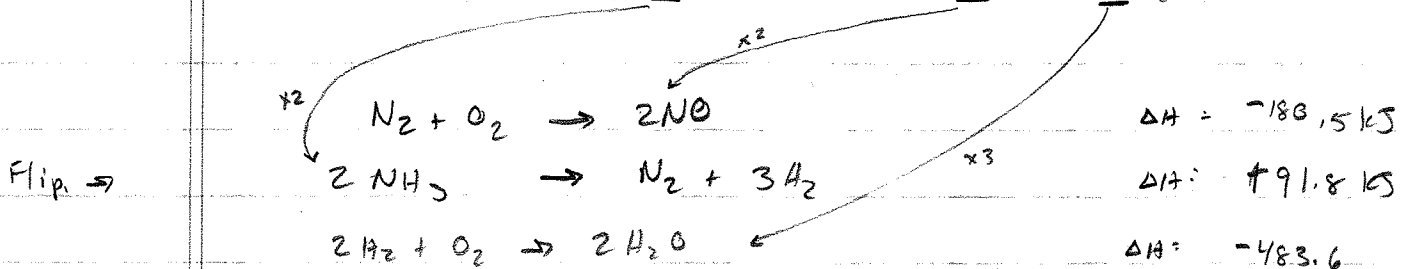
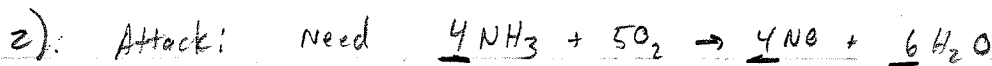
Hess's Law Practice:



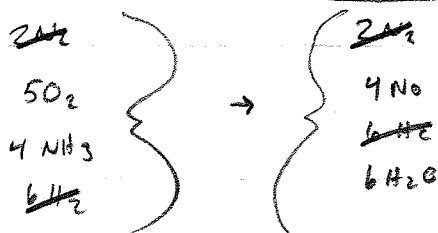
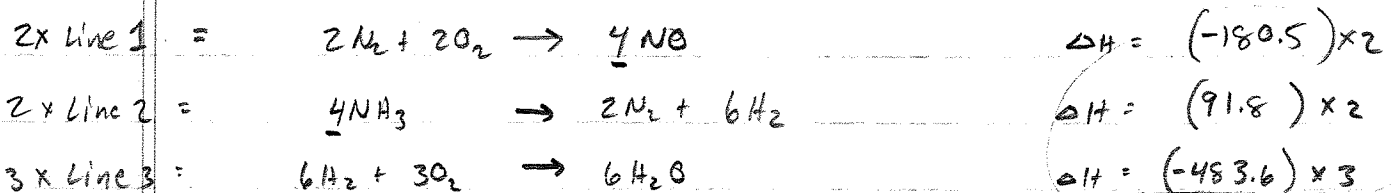
adding them together: Gives.



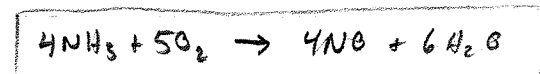
$\Delta H = -136.8 \text{ kJ}$



multiply to get desired coefficients in equation



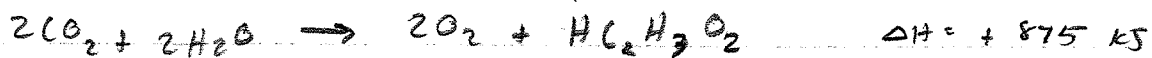
$\Delta H = -1628.2$



3) $\Delta H_f =$ Formation of product from its elements.



Flip #1.



multiply to get coefficients correct.

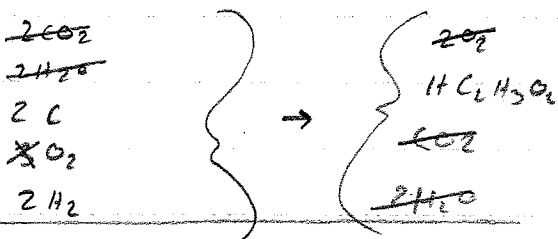
stays same



x2



x2



$$\Delta H = -4185.62$$

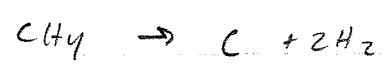


Flip 1



$\Delta H = +91.8 \text{ kJ}$

Flip 2



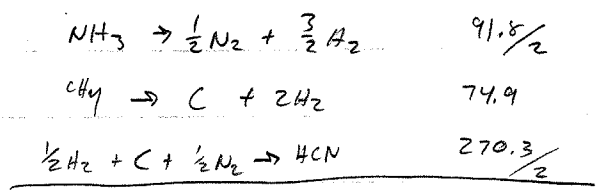
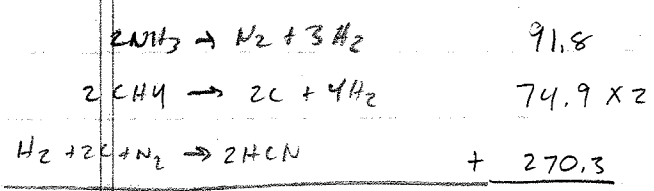
$\Delta H = +74.9 \text{ kJ}$



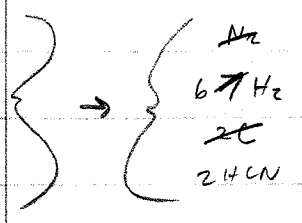
$\Delta H = +270.3 \text{ kJ}$

2 methods

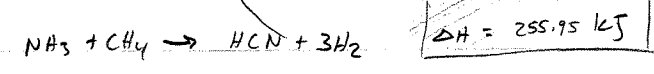
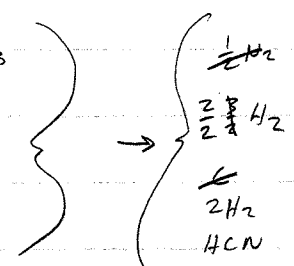
either multiply [eq 2 by 2] or [1 + 3 by (1/2)]



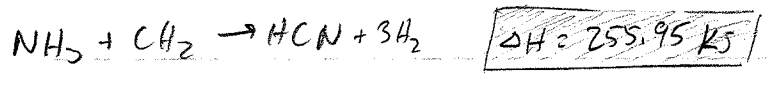
- 2NH₃
- 2CH₄
- 4C
- 2C
- 4H₂



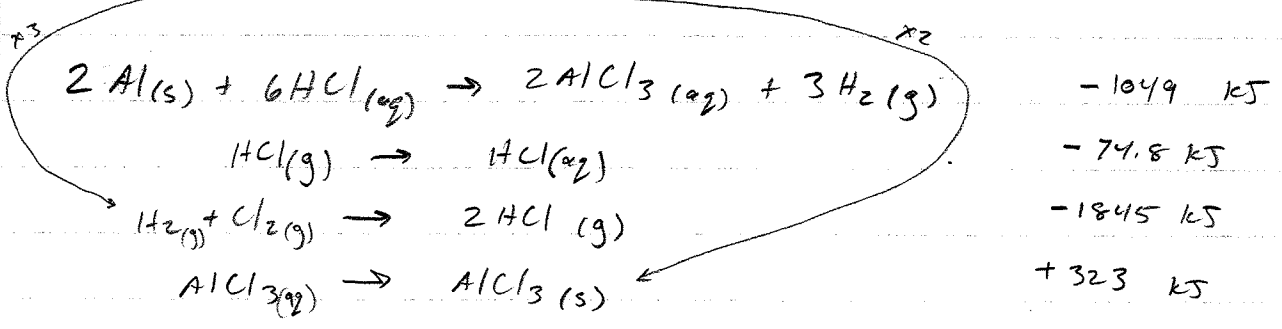
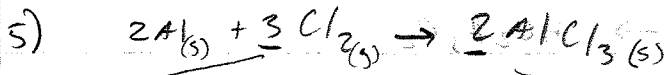
- NH₃
- CH₄
- 1/2 H₂
- C
- 1/2 N₂



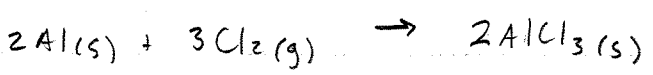
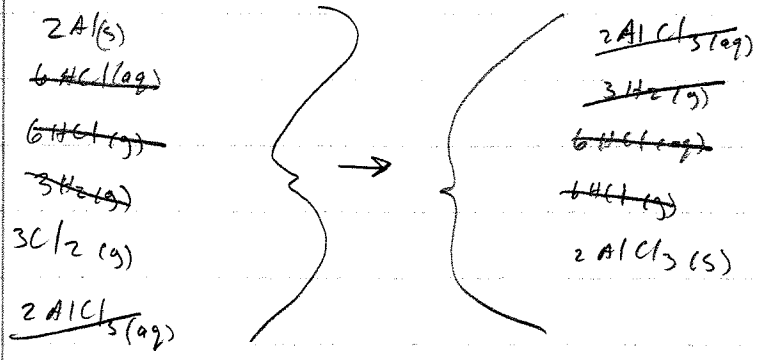
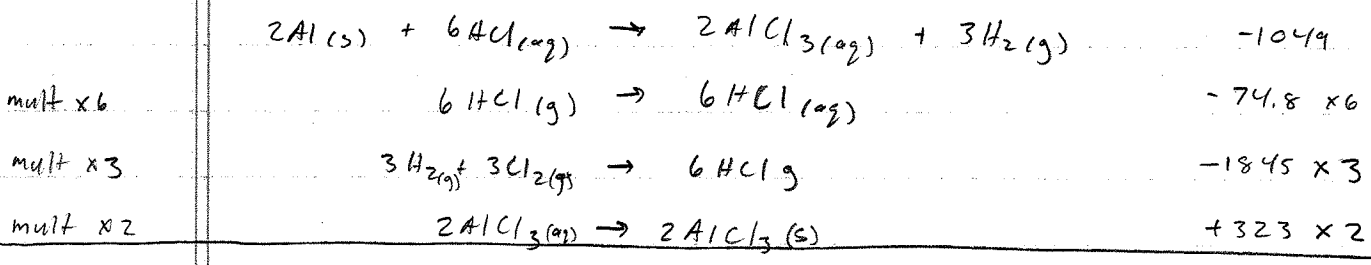
divide by 2 for proper coefficients



states are important!



multiply to get correct coefficients.



$\Delta H = -6709.6 \text{ kJ}$