1) Is this reaction exothermic or endothermic? $N_2 + 3H_2 \rightarrow 2NH_3 + 92.05 \text{ KJ}$

2) What is <u>different</u> about the equation below?
N₂ + 3H₂ ↔ 2NH₃ + 92.05 KJ
What do you think the difference means???

\leftrightarrow Equilibrium! \leftrightarrow

Some reactions can go forwards AND backwards

$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g) + 92.05 \text{ KJ}$

OR 2NH₃ (g) + 92.05 KJ \rightarrow N₂ (g) + 3H₂ (g)

\leftrightarrow Equilibrium! \leftrightarrow

 EQUILIBRIUM = the point at which the forward reaction is happening at the same <u>RATE</u> as the reverse reaction

 Are the CONCENTRATIONS of reactants and products the same?????
 – NO!!!!! (well *maybe*, but it doesn't have to be!)

↔ Le Chatelier's principle ↔

If a stress is applied to a reaction at equilibrium the reaction changes to relieve that stress

How do you "Stress" a reaction???

↔ Le Chatelier's principle ↔

Change:

Temperature Concentration Pressure



[N₂] During the Stress no longer @ equilibrium



[N₂] Before Stress Applied @ original equilibrium position ↔ Let's Change the Concentration!

$N_2 + 3H_2 \leftrightarrow 2NH_3 + 92.05 \text{ KJ}$

