Answer Key for FRQ Practice #6, p142

a) P_{NH_3} is **unaffected**. Because $K_p = (P_{NH3})(P_{H2S})$, the amount of solid NH_4HS present does not affect the equilibrium.

b) P_{NH_3} **decreases**. Adding H_2S(s) increases amount of H_2S(g), since the solid sublimes. The added H_2S(g) shifts equilibrium left to use up H_2S(g) and re-establish equilibrium, which will use up some NH_3(g).

c) The mass of NH_4HS increases, K remains the same. A decrease in volume causes the pressure of each gas to increase, causing reaction to shift left towards fewer moles of gas to re-establish equilibrium, producing more solid NH_4HS.This leftward shift decreases P_{NH_3} and P_{H_2S} back to their initial values, leaving K unchanged.

*Note: only changing the temperature can change the value of K!

d) The mass of NH_4HS decreases, K increases. Because the reaction is endothermic, increasing temperature will shift the reaction right to use up the added heat, which also uses up some NH_4S(s). As the reaction shifts right, P_{NH_3} and P_{H_2S} increase, increasing the value of K.