HONORS CHEMISTRY
HOMEWORK 9b. Name: _____

HOMEWORK RULES: *NAME on each page; *STAPLE multiple pages together;
*NO RAGGED EDGES; *SHOW WORK for computations

1. A reaction has $\Delta H = -76$ kJ and $\Delta S = -117$ J/K.
   a. Calculate ΔG at 25^{o} C. Is the reaction spontaneous at this temperature?
   b. Over what range of temperatures, if any, will this reaction be spontaneous?

2. A reaction has $\Delta H = 98$ kJ and $\Delta S = 292$ J/K.
   a. Calculate ΔG at 25^{o} C. Is the reaction spontaneous at this temperature?
   b. Over what range of temperatures, if any, will this reaction be spontaneous?

3. The reaction of graphite with hydrogen at 300 K can be represented as

$$C\,(s) + 2\,H_2\,(g) \dashrightarrow CH_4\,(g)\ \text{(methane)}$$

For this reaction, $\Delta H = -74.8$ kJ and $\Delta S = -80.9$ J/K.
a. Is this reaction spontaneous at 300 K?
b. Over what range of temperatures, if any, will this reaction be spontaneous?