$PV = nRT$ 5.2

5. Calculate the number of moles of $CO_2(g)$ initially placed in the container.

0.105 = $n = \frac{PV}{RT}$

6. For the reaction mixture at equilibrium at 1,160 K, the partial pressure of the $CO_2(g)$ is 1.63 atm. Calculate (Total pressure = $P_{co2} + P_{CO}$)

   a. the partial pressure of $CO(g)$, and

   b. The value of the equilibrium constant, K_P.

$8.37 = 1.63 + CO$ 6.74 atm

$K_p = \frac{(6.7)^2}{1.63} = 27.$

7. If a suitable solid catalyst were placed in the reaction vessel, would the final total pressure of the gases at equilibrium be greater than, less than, or equal to the final total pressure of the gases at equilibrium without the catalyst? Justify your answer.

In another experiment involving the same reaction, a rigid 2.00 L container initially contains 10.0 g of $C(s)$, plus $CO(g)$ and $CO_2(g)$, each at a partial pressure of 2.00 atm at 1,160 K.

8. Is the reaction vessel at equilibrium? If so, justify your answer. If not which way will it shift to achieve equilibrium? Justify.

$K = \frac{p(CO)^2}{pCO_2} = \frac{2^2}{2} = 2 = Q < K$ → P

9. If at equilibrium the following stress are applied how will the reaction shift to overcome the stress?

   a. $CO_2(g)$ is added →

   b. Solid C added X

   c. Contents are pumped into an 1L ridged container ↑P ←

   d. The reaction is cooled to 1000K. ←

   e. A catalyst is added. X

   f. Helium is pumped into the container doubling the total pressure X

$E + CO_2 + C(s) \rightarrow 2CO$

$K_p = \frac{p(CO)^2}{pCO_2}$

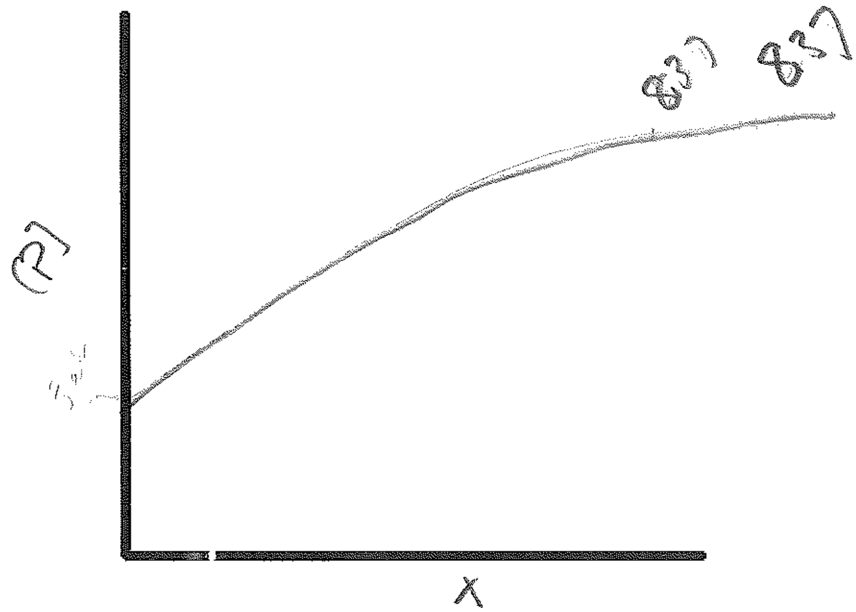
$$\text{Energy} + C(s) + CO_2(g) \leftrightarrow 2\,CO(g)$$

Solid carbon and carbon dioxide gas at 1,160 K were placed in a rigid 2.00 L container, and the reaction represented above occurred. As the reaction proceeded, the total pressure in the container was monitored. When equilibrium was reached, there was still some C(*s*) remaining in the container. Results are recorded in the table below.

(PV = nRT R = .0821)

Time(hours)	Total pressure of gasses @1160K
0	5.00
2	6.26
4	7.09
6	7.75
8	8.37
10	8.37
12	?

1. On the chart below, sketch out the relative pressures of the contents of the reaction over the course of 12 hours. Label the axis.



2. What will the pressure of the container be at 12 hours? 8.37

3. Why did the pressure stop changing at 10 hours? Equilibrium

4. Write the expression for the equilibrium constant, K_p, for the reaction $K_p = \frac{P(CO)^2}{P(CO_2)}$