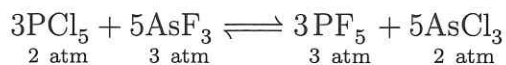14. The following reaction is being studied at 100 °C where all the components are in the gas phase and the equilibrium constant is approximately 5750.

$$3PCl_5 + 5AsF_3 \rightleftharpoons 3PF_5 + 5AsCl_3$$

2 atm   3 atm   3 atm   2 atm

The initial partial pressures of all the reactants and products are given below the respective species in the balanced chemical equation. What will be the partial pressure of the PCl_5 gas when equilibrium is reached? Please write your final answer in the box at the bottom of the page. (*Show all work, including your ICE table, to get full credit*)   (10 pts)

$$Q = \frac{(P_{PF_5})^3 (P_{AsCl_3})^5}{(P_{PCl_5})^3 (P_{AsF_3})^5} = \frac{3^3 2^5}{2^3 3^5} = \frac{2^2}{3^2} = \frac{4}{9} = 0.44$$

PROCEED TOWARD PRODUCTS

	PCl_5	AsF_3	PF_5	$AsCl_3$
I	2	3	3	2
c	$-3x$	$-5x$	$+3x$	$+5x$
E	$2-3x$	$3-5x$	$3+3x$	$2+5x$

$x = [0, .6]$

$$K = 5750 = \frac{(3+3x)^3 (2+5x)^5}{(2-3x)^3 (3-5x)^5}$$

$X = 0.318$

$2 - 3(.318) = 1.046$

$\boxed{1.046}$ atm