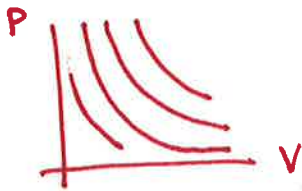


Adkins 2.1

(2pts)

Isotherms cannot intersect. This can be shown for the specific case of an ideal gas, where $P \propto \frac{1}{V}$ for an isotherm. Obviously, curves of the form $P \propto \frac{1}{V}$ do not intersect if the proportionality constant is different.



But what about for substances that do not obey $PV = RT$? Could the isotherms for other substances intersect? No. This can be seen for two reasons. First, if two isotherms intersect, then $\left(\frac{dP}{dV}\right)_T$, which is the inverse of the isothermal compressibility would have two values. Second, it would imply that, at the point of intersection, the substance would have two different temperatures.