**EXTRACTING KAPPA**

**GIVEN**: A substance that obeys the ideal gas equation of state,



**FIND**: An expression for the isothermal coefficient of compressibility.

**SOLUTION**: The isothermal coefficient of compressibility is given by,



Rewriting the ideal gas equation of state allows us to take the required derivative,



Substituting this into the expression for **,



**REFLECTION:**

* We have ‘extracted’ ** from the ideal gas EOS. The EOS itself does not contain **, but through the calculus, we can determine an expression for **!
* Notice that the units of ** are reciprocal pressure. This is consistent with what we see in Tables 3.1 and 3.2 of the book.
* For a substance that obeys the ideal gas EOS, this is a fairly easy exercise. However, as the EOS becomes more and more complex, the calculus can get very complicated. ☹