# Solutions to Pathria's Statistical Mechanics
# Chapter 3

SM-at-THU

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## Problem 3.1

## Problem 3.2

## Problem 3.3

## Problem 3.4

## Problem 3.5

Since the Helmholtz free energy $A(N, V, T)$ has the property:

$$A(\lambda N, \lambda V, T) = \lambda A(N, V, T)$$

Differentiate with respect to $\lambda$ and substitute $\lambda = 1$ immediately yields

$$N\left(\frac{\partial A}{\partial N}\right)_{V,T} + V\left(\frac{\partial A}{\partial V}\right)_{N,T} = A$$

## Problem 3.6

## Problem 3.7