

## W4-2-3 Helmholtz energy 3

Provide the total differential (the notation with the partial derivatives),  $da$  of the Helmholtz energy.

The total differential of the Helmholtz energy is:  $da = \left(\frac{\partial a}{\partial T}\right)_v dT + \left(\frac{\partial a}{\partial v}\right)_T dv$ .