Thermal Physics, Autumn 2016 CMI
Problem set 7
Due by the beginning of lecture on Monday Oct 17, 2016
Thermodynamic potentials

1. $\langle \mathbf{12} \rangle$ In class we derived the first Maxwell relation

$$\left(\frac{\partial T}{\partial V} \right)_S = - \left(\frac{\partial p}{\partial S} \right)_V \tag{1}$$

from the first law expressed in terms of internal energy $dU = TdS - pdV$ and using the equality of mixed second partials of U. Apply similar reasoning to obtain three more Maxwell relations from the first law expressed in terms of (a) Helmholtz free energy F, (b) enthalpy H and (c) Gibbs free energy G.