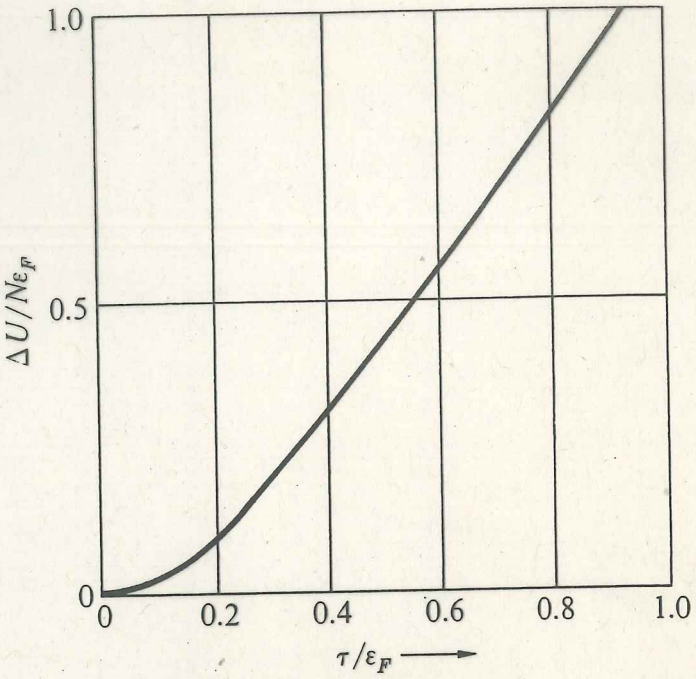
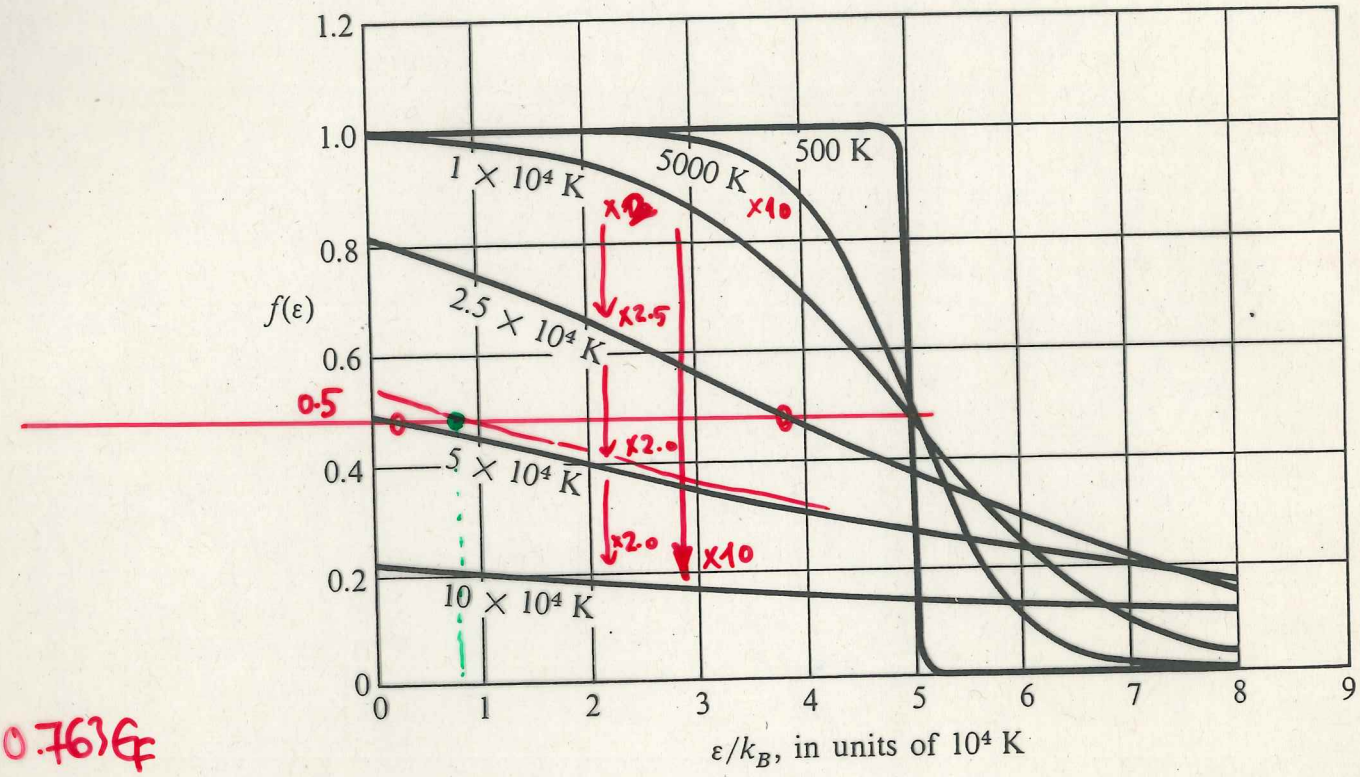


Figure 7.4 Temperature dependence of the energy of a noninteracting fermion gas in three dimensions. The energy is plotted in normalized form as $\Delta U/N\varepsilon_F$, where N is the number of electrons. The temperature is plotted as τ/ε_F.



0.763 ε_F ≈ 38150 K

Figure 7.5 Fermi-Dirac distribution function at various temperatures, for $T_F \equiv \varepsilon_F/k_B = 50\,000$ K. The results apply to a gas in three dimensions. The total number of particles is constant, independent of temperature. The chemical potential at each temperature was calculated with the help of Eq. (20) and may be read off the graph as the energy at which $f = \frac{1}{2}$. Courtesy of B. Feldman.

$$N = \int_0^\infty d\epsilon\, D(\epsilon) f(\epsilon, \tau, \mu) \qquad (20)$$