Problem 1.

Derive the completeness relation for a massive particle of spin 1 (see Problem 9.27 for the massless analog.) [Hint: Let the z axis point along $\mathbf{p}$. First construct three mutually orthogonal polarization vectors $(\epsilon^{(1)}{}_u, \epsilon^{(2)}{}_u, \epsilon^{(3)}{}_u)$ that satisfy $p^u \epsilon_u = 0$ $\epsilon_u \epsilon^u = \text{-1}$.]