Problem set # 1

A steam power plant operates on a simple Rankine cycle between the pressure limits of 3 MPa and 50 kPa. The temperature of the steam at the turbine inlet is 400°C, and the mass flow rate of steam through the cycle is 60 kg/s.
   a) Show the cycle on a T-s diagram.
   b) Determine the thermal efficiency of the cycle.
   c) Determine the net power output of the plant.

A steam power plant operates on a simple Rankine cycle between the pressure limits of 1250 and 2 psia. The mass flow rate of steam through the cycle is 17 lbm/s. The moisture content of the steam at the turbine exit is not to exceed 10%.
   a) Show the cycle on a T-s diagram.
   b) Determine the minimum turbine inlet temperature.
   c) Determine the rate of heat input in the boiler.
   d) Determine the thermal efficiency of the cycle.