c) What is quality of the steam?
d) 87% of the mass in the tank is removed while keeping pressure constant at 15 bar. What is the final temperature in the tank?

Problem 2.7: An eight-liter pressure cooker contains a mixture of steam and liquid water at 2 bar. Through a level indicator we can see that the liquid occupies 25% of the volume inside the cooker.
a) What is the temperature inside the cooker?
b) What is the total mass of water (liquid plus vapor) in the cooker?
c) What is the mass fraction of the liquid?
d) The cooker, while it remains sealed, is placed under running water until its temperature cools to 25 °C. What is the pressure in the cooker?
e) What force does it take to unseal the cooker? The cover is circular with a radius of 20 cm.

Problem 2.8: a) A pressure cooker is filled to the brim with water at 80 °C and the lid is locked. The temperature is then changed until the contents become saturated liquid. What is the temperature and pressure at that point?
pressure
b) A closed pressure cooker contains 50% by volume liquid and 50% water vapor at 1 bar. The ~~temperature (or pressure)~~ is then changed until the point where the contents become a single phase. Is that phase saturated liquid or saturated vapor?
c) A closed rigid vessel that contains a pure fluid is cooled until the contents become saturated vapor. Determine whether the initial state is superheated vapor, compressed liquid, or vapor/liquid.
d) A closed rigid vessel that contains a pure fluid is heated until the contents become saturated liquid. Determine whether the initial state is superheated vapor, compressed liquid, or vapor/liquid.

Problem 2.9: A tank whose volume is 12 m^3 contains 6.2 kg of water at 1.4 bar.
a) What is the phase (liquid, vapor, liquid/vapor mixture)?
b) What is the temperature?
c) We add more steam to the tank while maintaining its temperature constant at the value calculated in part b. As a result, the pressure in the tank increases. Determine how much water (in kg) of steam must be added to bring the steam in the tank to the point of condensation.
d) Draw a qualitative PV graph and show the path of the process for part c.

Problem 2.10: a) Use data from the steam tables to construct the PV graph of water. Show the saturated liquid, the saturated vapor, the critical point. Include the isotherms at 100 °C, 200 °C, 300 °C and 400 °C. Make two plots, one using linear axes and one in which the pressure axis is linear but the volume axis is logarithmic.