1. Two reservoirs have a surface elevation difference of 15 m, and are connected by a steel pipeline 300 m long. The pipeline consists of two sections of pipe. The first is 200 m long and is 40 cm in diameter. The remaining section is 30 cm in diameter. How long does it take 1000 m$^3$ of water drain from the upper reservoir to the lower reservoir. Do not neglect minor losses.

   a. Sketch the equipment in this problem. Identify all system variables on the sketch.

   b. What type of flow problem is this?

   c. Write down the energy equation for this problem. Simplify it by crossing out all terms that cancel. Circle the remaining terms that are known.

   d. Write down all other relevant equations used in solving this problem.

   e. List the minor loss elements (by name) and obtain appropriate loss coefficients

   f. List the steps in solving this problem

   g. Answer the question by performing the necessary calculations