Tutorial 3

Problem 1: A 350-mm diameter pipe under a pressure of 120 psi has a water velocity of 6 m/s. The pipe then constricts to 150 mm diameter. Assuming no friction headloss, what is the pressure in the 150-mm diameter section (psi)?

Problem 2: If the pressure in a water main is 350 KPa, what is the remaining pressure at a faucet in a building 9 m above the main, assuming a headloss of 150 KPa in the service pressure?

Problem 3: What is the size of a pipe line that should be used to supply 200 L/s so that the headloss does not exceed 10 m/ 1000 m assuming that C=130 (using both, nomogragh and the Hazen-Williams equation).

Problem 4: Three pipes are arranged in parallel:

	Diameter, mm	C	Length, m
Top section	100	140	174
Middle section	150	80	274
Bottom section	200	100	366

If the approaching flow is 0.19 m^3/s,

(a) Find the equivalent length of a 300-mm diameter pipe with C=300
(b) What is the headloss through this system?
(c) What is the flowrate through each pipe?

Problem 5: A pipe with a C value of 120 connects points A, B, C and D which have respective elevations of 100, 110, 113 and 107 meter. Pipe diameters and lengths are:

Pipe line	Diameter, mm	Length, m
A - B	150	140
B - C	200	95
C - D	250	85

Flow is 15 L/s and pressure at A is 70 psi. Determine the pressure at point E located on pipe BC, and 30 m downstream from B. (neglect minor losses and velocity head).

Problem 6: An old 350-mm diameter main (C=60) carries water 700 m to a pond where the flow is free out at the end of the pipe. A pressure gage on the upstream end of the pipe reads 35 psi. The pipe is then cleaned and has a new plastic linear inserted (C=150). Lining the pipe decreases its diameter to 330 mm.

(a) What was the flow through the old pipe?
(b) What is the flow through the new pipe?

*Adapted form Water Supply and Sewerage, McGhee T. and Zaheed W. problems