Problem 149A

A laminar flow of water (density 1000 kg/m^3, dynamic viscosity 10^{-3} $kg/m\ s$) is forced through a tube of internal diameter 1 mm and length 1 m by an applied pressure difference between the two ends of 0.15×10^5 $kg/m\ s^2$. Find (a) the average velocity of flow in the tube (b) the Reynolds number of the flow and (c) the friction factor in the tube.

If the pressure difference is doubled, by what factor does the average velocity increase?

Will this flow, in fact, be laminar or will it be turbulent? What criterion did you use to make this judgement?