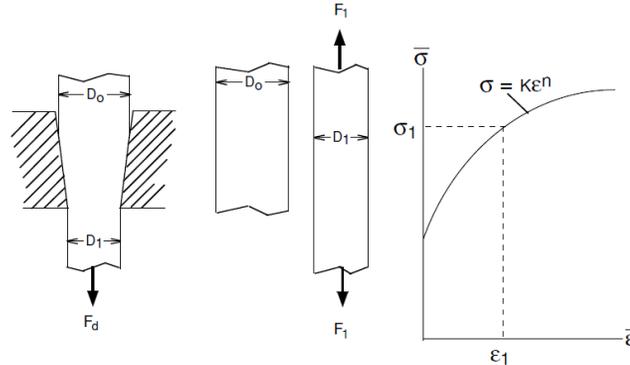**1-** The diameter, D_0, of a round rod can be reduced to D_1 either by a tensile force of F_1 or by drawing through a die with a force, F_d, as sketched in the figure. Assuming ideal work in drawing, compare F_1 and F_d (or σ_1 and σ_d) to achieve the same reduction.

2- An aluminum alloy billet is being hot extruded from 30cm diameter to 5cm diameter as sketched in the figure. The flow stress at the extrusion temperature is 60 MPa (no work hardening). Assume $\eta=0.48$
a) What extrusion pressure is required?
b) Calculate the lateral pressure on the die walls (or container walls).
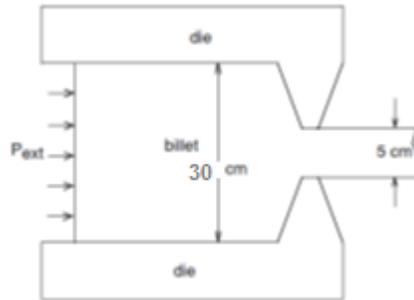
3- You are asked to plan a wire-drawing schedule to reduce copper wire from 3.6 mm to 0.5 mm in diameter. How many wire drawing passes would be required to be sure of no failures, if the drawing stress never exceeds 80% of the flow stress, and the efficiency is assumed to be 65%?

4- By using ideal work method, calculate the pressure P, required for the following compressive deformation processes: **a)** plane strain compression **b)** disk compression. Assume that the mean flow stress of the material is constant during deformation and is equal to: $\overline{Y_m}$.