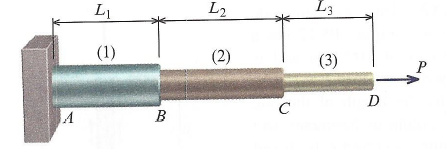
## Practice Problems – Short Documentation (8 points) For these 2 problems, the Given, Find, and Solution are the only required documentation.

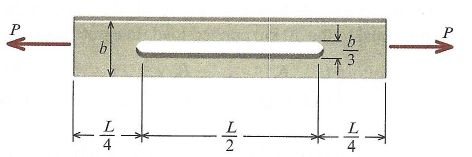
1. The figure below shows three solid cylinders that have been welded together on a common axis. The rectangle base at A is fixed and rigid. All the cylinders have a modulus of elasticity of 40 GPa. The dimensions are:   
   L1 = 1440 mm A1 = 260 mm2

L2 = 1680 mm A2 = 130 mm2  
L3 = 1200 mm A3 = 65 mm2

Calculate the magnitude of P so that the displacement at D will be 60 mm to the right.

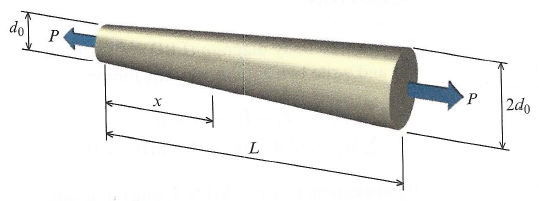


1. A rectangular bar with a slot is shown below. Dimensions are L = 400 mm, b = 45 mm, E = 72 GPa, and the thickness is t = 8 mm. If load P is 18 kN, calculate total elongation of the bar.



## Practice Problem – Full Documentation (4 points) For this problem, all 7 steps of the engineering problem-solving documentation are required (Given, Find, Expected Solution, Plan, Solution, Check, and Reflection).

1. A homogeneous rod with length L and elastic modulus E is shown in the figure below. The diameter varies linearly from d0 at one end to 2\*d0 at the other end. An axial load of P is applied to each end. Do the following (as functions of the variables given in the problem)
   1. Determine the stress distribution of a cross-sectional area at arbitrary location of x (so long as x is between 0 and L).
   2. Determine the total elongation of the rod.



## Preparation for Next Class Period (4 points)

Note: Write down enough to show that you’ve done the following things to prepare for our next class session. This part of your homework can all be on a single page. It can be typed up, hand-written, or a combination of both. Put this at the end of your homework packet.

1. TB Reading sections 5.4 through 5.5.
   1. How can you tell if a problem is statically determinate vs. statically indeterminate?
   2. Review the solution methodology for statically indeterminate problems and write down any steps you don’t understand so they can be discussed during next class
2. Preview MM Modules M5.5 and M5.10 (don’t need to turn in anything for this review)