1. The cylindrical rod is made of steel with $E=30\times10^3$ ksi. ν =0.3 and σ_y= 50 ksi. If the initial length of rod is L = 4 ft and its original diameter is d = 1 in.. (a). what is the change in length ΔL? (b). what is the change in diameter Δd. (c). what is the true strain ?(an axial load P=10 kips)
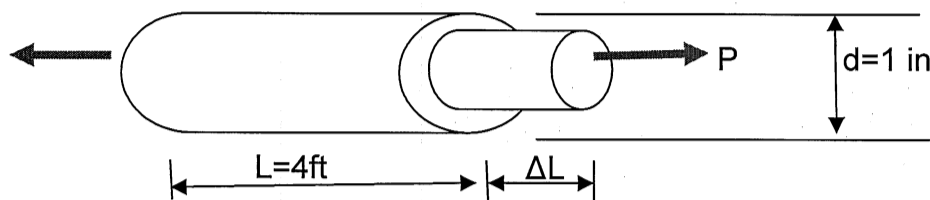

2. A hollow tube of steel 60 mm outer diameter by 50 mm inner diameter is twisted until failure. The shear modulus G = 200 GPa, and the yield stress in shear is τ_y=100MPa (a). Determine the yield torque. (b). determine the modulus of rupture.
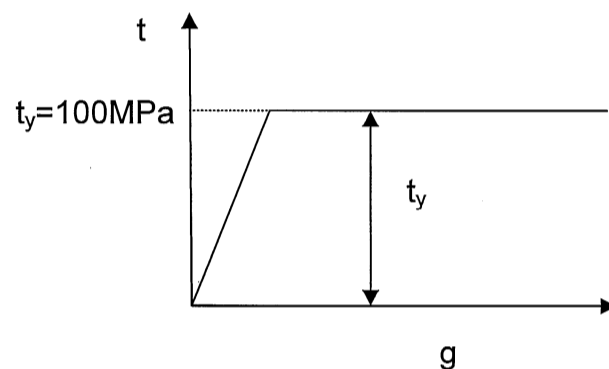
3. The simple supported beam is made of timber that has an allowable tensile stress of $(\sigma_{allow})_T$=40MPa, an allowable compressive stress of $(\sigma_{allow})_C$=20MPa, and an allowable shear stress of τ_{allow}=10MPa。 Determine the dimension of structure if it is to be rectangular and have a height-to-width ratio of h/b=2.0
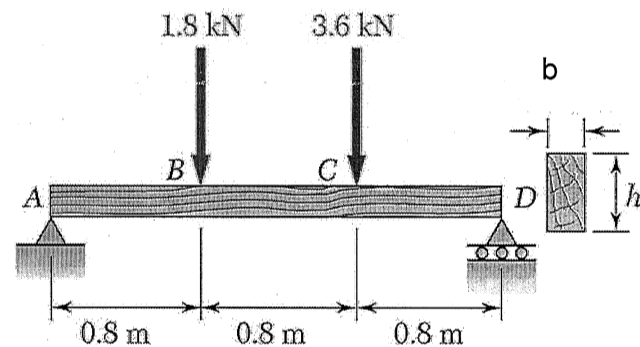
4. For the given state of stress, determine
   (a) Mohr's circle
   (b) principal stresses
   (c) maximum in-plane shear stress
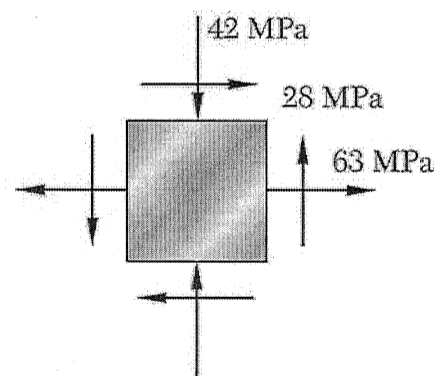
5. For the cantilevel beam and loading shown, determine
   (a) the slope at point C
   (b) the delection at point C