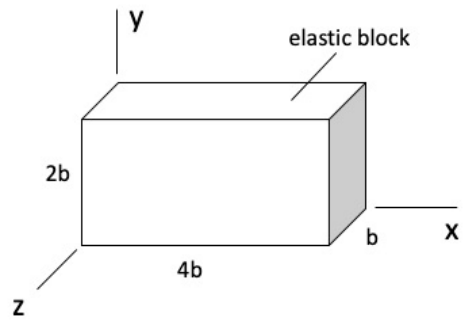
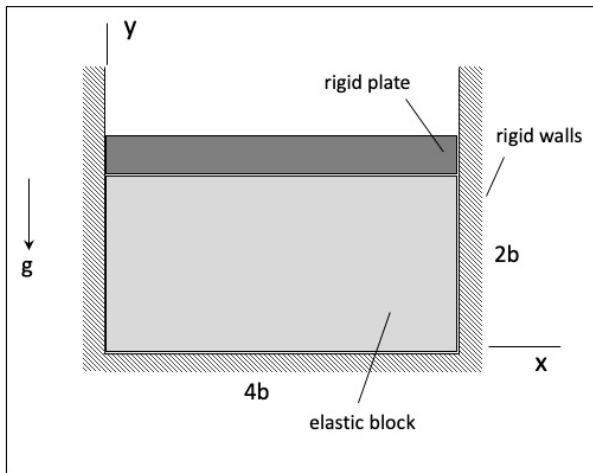


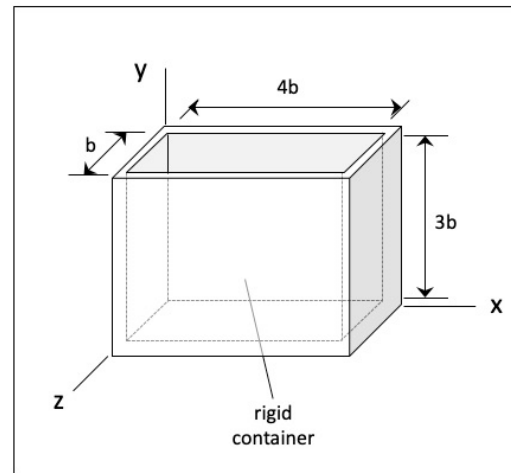
A cuboid-shaped block having  $(x,y,z)$  dimensions of  $(4b, 2b, b)$  is made up of an elastic material having a Young's modulus of  $E$ , a Poisson's ratio of  $\nu$  and a coefficient of thermal expansion of  $\alpha$ . The weight of the block can be considered to be negligible.



- a) The block is snugly placed between two smooth, rigid, vertical walls, as shown below, with no restraints placed on the  $z$ -faces of the block. A rigid plate having a weight of  $W$  is placed on top of the block, and the temperature of the block is held fixed. Determine the  $(x,y,z)$  components of normal stress and strain, and the  $(x,y,z)$  dimensions of the block resulting from the weight of the plate.
- b) The block is now snugly placed within a rigid container with smooth surfaces, as shown below. The temperature of the block is uniformly increased by an amount of  $\Delta T$ . Determine the  $(x,y,z)$  components of normal stress and strain, and the  $(x,y,z)$  dimensions of the block resulting from the temperature increase of the material.



**Part (a)**



**Part (b)**