

38. (a) Since the brick is now horizontal and the cylinders were initially the same length  $\ell$ , then both have been compressed an equal amount  $\Delta\ell$ . Thus,

$$\frac{\Delta\ell}{\ell} = \frac{F_A}{A_A E_A} \quad \text{and} \quad \frac{\Delta\ell}{\ell} = \frac{F_B}{A_B E_B}$$

which leads to

$$\frac{F_A}{F_B} = \frac{A_A E_A}{A_B E_B} = \frac{(2A_B)(2E_B)}{A_B E_B} = 4 .$$

When we combine this ratio with the equation  $F_A + F_B = W$ , we find  $F_A = \frac{4}{5}W$ .

- (b) This also leads to the result  $F_B = W/5$ .  
(c) Computing torques about the center of mass, we find  $F_A d_A = F_B d_B$  which leads to

$$\frac{d_A}{d_B} = \frac{F_B}{F_A} = \frac{1}{4} .$$