Exercise 10-1

(a) (tensile) strain $\varepsilon = \frac{\Delta l}{l_0} = \frac{9.00 \times 10^{-2}\ m}{26.0\ m} = 3.46 \times 10^{-3}$

$(3.46_2 \times 10^{-3})$

(b) (tensile) stress $\sigma = \frac{F}{A} = \frac{mg}{\pi r^2}$

$$\therefore \sigma = \frac{(79.0\ kg)(9.80\ m/s^2)}{\pi (4.50 \times 10^{-3}\ m)^2} = 1.22 \times 10^7\ \frac{N}{m^2}$$

$$\left(1.21_7 \times 10^7\ \frac{N}{m^2}\right)$$

(c) $Y = \frac{\sigma}{\varepsilon} = \frac{1.21_7 \times 10^7\ N/m^2}{3.46_2 \times 10^{-3}} = 3.52 \times 10^9\ N/m^2$