20. (a) The sign is attached in two places: at $x_1 = 1.00\,\text{m}$ (measured rightward from the hinge) and at $x_2 = 3.00\,\text{m}$. We assume the downward force due to the sign's weight is equal at these two attachment points: each being *half* the sign's weight of mg. The angle where the cable comes into contact (also at x_2) is $\theta = \tan^{-1}(4/3)$ and the force exerted there is the tension T. Computing torques about the hinge, we find

$$T = \frac{\frac{1}{2}mgx_1 + \frac{1}{2}mgx_2}{x_2 \sin\theta} = \frac{\frac{1}{2}(50.0)(9.8)(1.00) + \frac{1}{2}(50.0)(9.8)(3.00)}{(3.00)(0.800)} = 408\ \text{N}\ .$$

(b) Equilibrium of horizontal forces requires the (rightward) horizontal hinge force be $F_x = T\cos\theta = 245$ N.

(c) And equilibrium of vertical forces requires the (upward) vertical hinge force be $F_y = mg - T\sin\theta = 163$ N.