

28. (a) Computing torques about the hinge, we find the tension in the wire:

$$TL \sin \theta - Wx = 0 \implies T = \frac{Wx}{L \sin \theta} .$$

- (b) The horizontal component of the tension is $T \cos \theta$, so equilibrium of horizontal forces requires that the horizontal component of the hinge force is

$$F_x = \left(\frac{Wx}{L \sin \theta} \right) \cos \theta = \frac{Wx}{L \tan \theta} .$$

- (c) The vertical component of the tension is $T \sin \theta$, so equilibrium of vertical forces requires that the vertical component of the hinge force is

$$F_y = W - \left(\frac{Wx}{L \sin \theta} \right) \sin \theta = W \left(1 - \frac{x}{L} \right) .$$