

Chapter 10Problem 80

$$\tau = 5.00 \times 10^3 \text{ N}\cdot\text{m}$$

What tension is needed  
to raise the drawbridge?

$$\tau = r \cdot F \sin \theta \quad \theta = 30^\circ$$

$$\tau = L \cdot T \sin \theta$$

$$T = \frac{\tau}{L \sin \theta}$$

$$T = \frac{5.00 \times 10^3 \text{ N}\cdot\text{m}}{(6.0 \text{ m}) \sin(30^\circ)} = \boxed{1,670 \text{ N}}$$

As the drawbridge rises,  $\theta$  gets larger.

$\therefore \sin \theta$  will get larger

and  $\boxed{T \text{ will get smaller}}$

