5. The object exerts a downward force of magnitude $F = 3160$ N at the midpoint of the rope, causing a "kink" similar to that shown for problem 10 (see the figure that accompanies that problem). By analyzing the forces at the "kink" where $\vec{F}$ is exerted, we find (since the acceleration is zero) $2T \sin\theta = F$, where θ is the angle (taken positive) between each segment of the string and its "relaxed" position (when the two segments are colinear). In this problem, we have

$$\theta = \tan^{-1}\left(\frac{0.35\,\mathrm{m}}{1.72\,\mathrm{m}}\right) = 11.5^\circ \ .$$

Therefore, $T = F/2\sin\theta = 7.92 \times 10^3$ N.