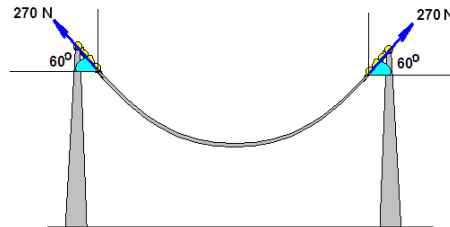


# Physics I

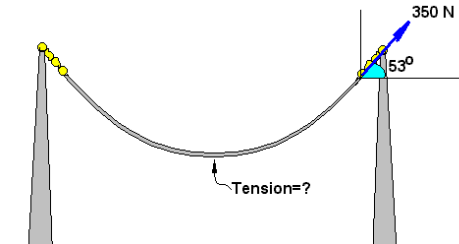
## Statics Problems Cables

Elasticity:  $\Delta L = \frac{FL}{EA}$  (the "flea" equation)

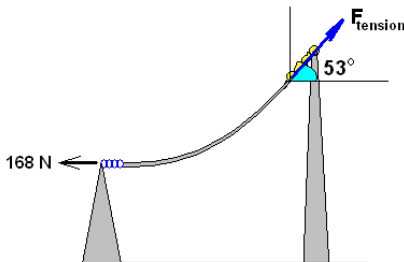
**Problem 1.-** Calculate the mass of the cable if the forces on the supports are as indicated:



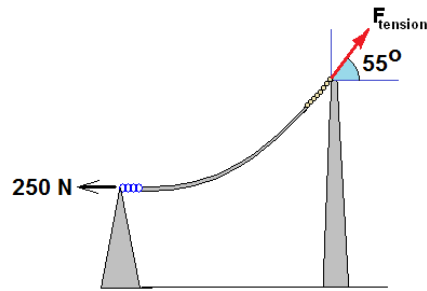
**Problem 2.-** Calculate the tension at the center of the cable if the force on the right support is 350N:



**Problem 3.-** Calculate the force of tension at the right support of the cable if the force on the left support is 168N, horizontal, as shown:



**Problem 3a.-** Calculate the mass of the cable shown in the figure if the tension at the right support makes an angle of  $55^\circ$  to the horizontal and the force on the left support is 250N, horizontal.



**Problem 4.-** What would be the maximum load that you can lift with a single steel cable that has an effective cross section of  $1 \text{ in}^2$  if you want a safety factor of 5?  
(1 inch = 0.0254 m)

**Problem 5.-**

a) What is the minimum cross-sectional area of a steel cable from which is suspended a 450kg load. Use a safety factor of 7. [Ultimate strength of steel =  $500 \times 10^6 \text{ N/m}^2$ ]

b) If the cable is 12m long, how much does it elongate?  
[Young's modulus of steel =  $200 \times 10^9 \text{ N/m}^2$ ]