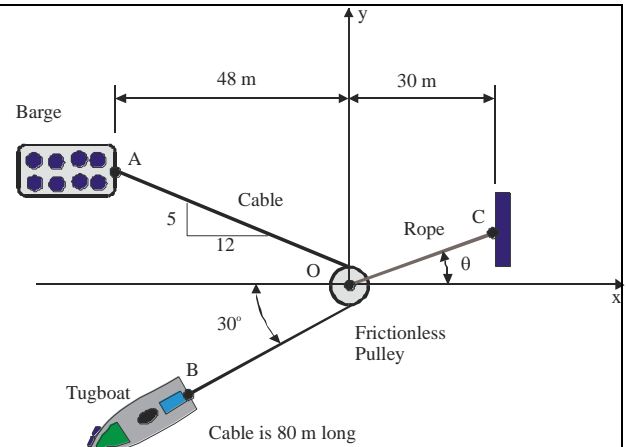


Engineering Statics Assignment #1

1) A tugboat is pulling a barge with a 80 m long cable in the configuration shown in the figure. The cable is attached to the barge at A and wraps around a frictionless pulley and is attached to the tugboat at B . (Neglect the radius of the pulley.) The pulley is attached to the dock by the rope OC . The cable breaks when the tension in the cable reaches 1000 N .

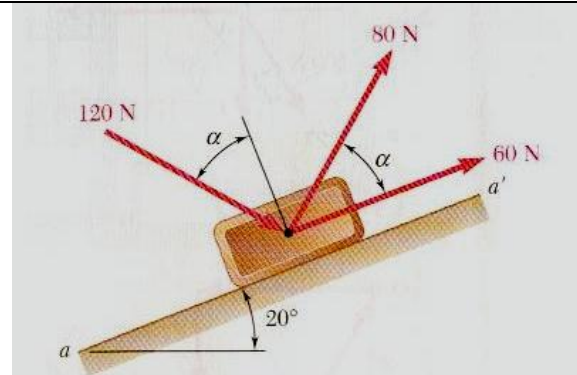
Determine the tension in the rope OC and the angle θ at the instant the cable breaks using,

- The graphical method (state the scale that you are using),
- Trigonometry method (sine and/or cosine rules)



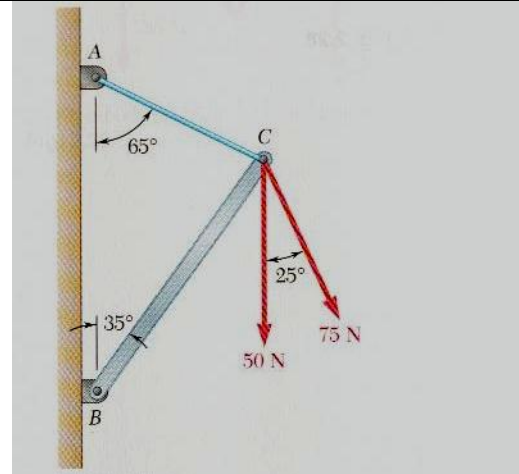
1) Knowing $\alpha = 40^\circ$, determine the resultant of the three forces shown using:

- The graphical method (state the scale that you are using),
- Trigonometry method (sine and/or cosine rules)



2) Determine the required tension in cable AC , knowing that the resultant of the three forces exerted at point C of the boom BC must be directed along BC , and the corresponding magnitude of the resultant using:

- The graphical method (state the scale that you are using),
- Trigonometry method (sine and/or cosine rules)



- 4) A mass, m , is suspended from a circular ring that is attached to supports by cables AB and AC as shown in the figure. The force in cable AB is 538.5 N.

Knowing that the point A is in equilibrium, determine the mass, m and the magnitude of the force in cable AC by each of the following methods:

- c) The graphical method (state the scale that you are using),
- d) Trigonometry method (sine and/or cosine rules), and

Note: $g = 9.8 \text{ m/sec}^2$

Also, the coordinates of B are $(-500, 200) \text{ mm}$

