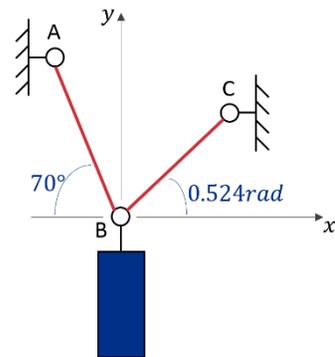


ENGR 122

Homework 2

NOTE: Use engineering format for problems 1 through 4. Use non-engineering format for problems 5 and 7. This is an individual assignment. If you don't have Mathcad installed yet, refer to the instructions on using the virtual workspace to access Mathcad found in HW1.

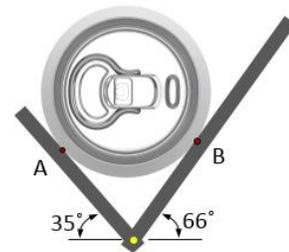
1. Two cables support an unknown weight. If the tension in cable AB is 150 lbf, then
 - a. Draw a FBD
 - b. Find the tension in cable BC (provide answer in lbf) **59.25lbf**
 - c. Find the unknown weight (provide answer in Newtons) **759N**



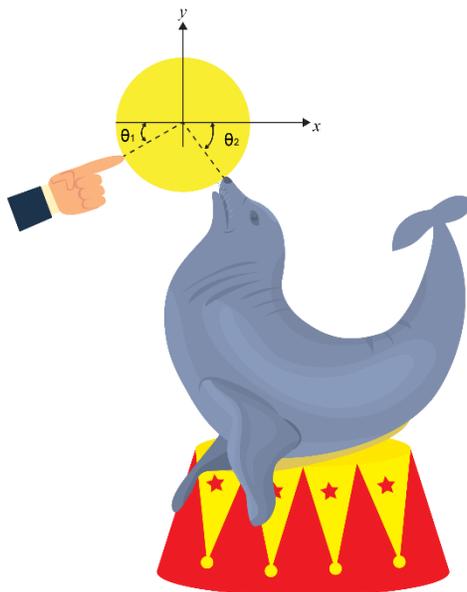
Helpful tips: $1 \text{ lbf} = 4.45 \text{ N}$ and $1 \text{ rad} = \pi/180 \text{ degrees}$

2. Rework Problem 1 using Mathcad to compute your answers. Set up the page using engineering format. Remember, when using units in Mathcad, that "lbs" is written as "lbf" which is pounds-force and that you must use the "deg" unit for your angles.

3. A group of ENGR 122 students are designing a new vending machine for dispensing soda cans. They decided to do a static equilibrium analysis to understand the forces acting on their system. The apparatus holding each soda can is shown below. If a typical soda can weighs 3.864 N , then find the value of the forces acting on the soda can at point A and at point B. Include the FBD as part of your solution. **A = 3.596N and B = 2.258N**



4. With a little help from his trainer, a seal at a circus balances a ball that has a mass of 1.36 kg on his nose. If $\theta_1 = 22^\circ$, and $\theta_2 = 62^\circ$, then what is the force that the seal's nose applies to the ball? Include the FBD as part of your solution. **Finger = 6.298N and Seal = 12.438N**



5. Review the list of sensors/devices that can be checked out for the ENGR 122 project. Choose one to research in more depth. Write a few sentences about how the sensor/device works. Include some potential applications for the sensor/device.
6. Come up with one idea for your "Idea Wallet" by thinking about something that could be fixed, improved, or developed through one of your hobbies, a sport, or a recreation activity. For your homework, please name the project idea, write up at least a two-sentence description of the idea, and provide pictures/sketches of the idea (when it makes sense to do so).

NOTE: You don't need to try to find a solution to the problem at this point!

7. Please complete the Engineering Student Survey found on the META ENGR 122 Moodle page.