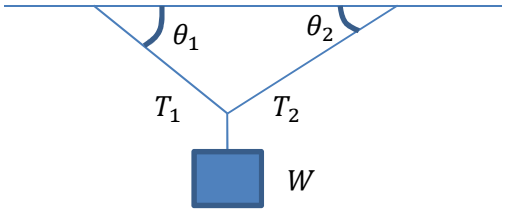
Name: _____ Section: _____ Practice for Exam1/Extra Credit Assignment

Topics: MATLAB, variables, scripts, vectors, plotting, input/output

Take 3 full minutes to read the ENTIRE cover sheet first.

SUBMIT script file (NO ZIP) before the end of the class time. Turn in cover sheet.

A weight W (*in Newton*) is attached to the ceiling by the mean of two cables, as shown here. Calculate the tension T_1 and T_2 (in *Newton*) using graphical analysis only.



Don't panic: the equations have been solved for you, and therefore the problem can be solved graphically. By solving the physics, T_2 can be expressed *as a function of* T_1 by two equations. These equations are linear equations of the form $y(x) = m * x + b$:

Equation 1: $$T_2(T_1) = \frac{\cos(\theta_1)}{\cos(\theta_2)} * T_1$$

Equation 2: $$T_2(T_1) = -\frac{\sin(\theta_1)}{\sin(\theta_2)} * T_1 + \frac{W}{\sin(\theta_2)}$$

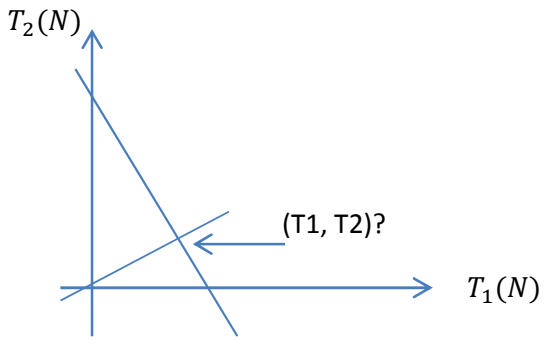
Assuming both angles and the weight are known by the user, develop a program that can solve the tensions for any similar setup by plotting both equations above and reading (T_1, T_2) on the intersection of these lines. The cable used can handle a maximum tension of 62N. Will it break? When complete, fill in the table **(5pts)**:

Angle 1 (degrees)	**Angle 2 (degrees)**	**W (Newton)**	**T1 (Newton) 2 decimals**	**T2 (Newton) 2 decimals**	**Break?**
45	37	90			
30	60	70			

Using the full 7 steps taught in this class, and only the material taught in this class at this time, develop a program that is easily reusable to solve the problem.

Step1**(5pts)**:

Step2:



Step3: (Equations given already)
Step4: (Assume values from scenario1 (line 1 in the table))
Step5: (solve graphically – hence no step5 needed)
Step6: not applicable
Step7a (comments) and 7b (place directly on the script file).

Requirements for the program itself:

- **(12pts)** prompt the user for the values of θ_1, θ_2, W.
- **(15pts)** define all vectors that can plot equation1 and 2
- **(10pts)** plot correctly, using colors, markers and line specifications AS SHOWN in the videos.
- **(15pts)** label the plot properly and fully

(7pts – other random errors!)

Within script:
name/section/description **(3pts)**
commands to clean up previous execution of MATLAB codes **(3pts)**
comments (which is considered the algorithm) **(5pts)**
spacing of code **(5pts)**
appropriate variable names (no single letters) **(5pts)**
semi-colon hiding intermediate calcuations **(5pts)**

Step7c **(5pts)**: Verify mathematically your solution seems accurate.