

Computer Assignment #1

The purpose of this assignment is to give the Engineering student practice in using computers and computer software in the solution of Engineering problems. Solving problems using a computer allows us to investigate problems that might be too tedious by hand, particularly when repetitive calculations and graphical results are required.

Software Requirements:

Solve the problem below using Excel, MatLab, or MathCAD (or some other math or spreadsheet software package approved by the instructor). Any version of these programs is acceptable. Both MatLab and Excel are available on campus. Recall that Excel is introduced in EGR 120 and MatLab is introduced in EGR 110, so you could refer to the textbooks for those courses for more information on using the software.

Sample Computer Solutions:

Sample computer solutions using Excel, MatLab, and MathCAD are available on the course website.

Assignment format:

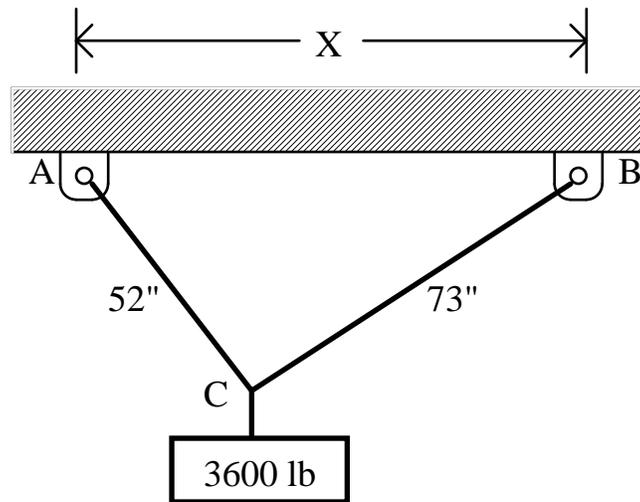
Your solution should be neat, clear, and professional in appearance. As a minimum, it should include (for each problem assigned):

- *complete statement of the original problem*
- *free-body diagram*
- *development of the equations to be solved by the computer*
- *computer solution, including comments and properly formatted tables and graphs*
- *final discussion of the results.*

Computer Problem #1:

- A) Consider the figure shown below. Assume that point A is fixed and point B is adjustable and may be moved horizontally from $x = 60$ inches to $x = 100$ inches. Use a computer to determine the tension in cable AC and the tension in cable BC for $x = 60$ inches to $x = 100$ inches in 2 inch increments. Tabulate the results. Also produce two computer generated graphs for T_{AC} vs x and T_{BC} vs x over the same range of x . Determine from your table or graphs where the minimum values of T_{AC} and T_{BC} occur.
- B) If each cable can support a maximum tension of 3000 lb, what is the allowable range for X ?

Note: It is always a good idea to check your results by hand for at least one set of calculation. Pick a value of x in the desired range, analyze the problem, and compare the results to your computer solution.

**Computer Problem #2:**

Consider the figure shown below.

- a) Form a table of the tensions in cables AB and AC for values of $d = 0$ to 1.8 m in increments of 0.05 m. Also form graphs of T_{AB} versus d and T_{AC} versus d . (Note: Assume that point A is fixed, and the length of AC will vary as distance d changes.)
- b) If each cable will safely support a maximum tension of 1 kN, use the graphs to estimate the acceptable range of values of d .

