

Homework and Take Home Quizzes

As future professionals in engineering or technology, you will often be called upon to do calculations for your company. The calculations you do can affect the cost and safety of the product. They are filed in the company's archives, and are legal documents. If a problem arises with the product, your calculations could be reviewed, and possibly even be used as evidence in a court of law.

It is *extremely* important to produce neat, well organized calculations. As you go through the process you should be thinking not only about the immediate result you are after, but also about how someone might view them in the future. Everything that is needed to reproduce them later should be included. Consider whether or not someone else can easily follow your work 6 months or a year after you have completed it.

It takes time and practice to develop the skills needed to produce a quality set of calculations. **Good habits begin now.** In this course, any homework, computer project, or take home quiz that you turn in must be done in a professional manner. Below you will find some guidelines to help you with this, but along with these guidelines you have to add the ingredient of pride in your work. You can lose from 5% to 15% off your project grade for lack of neatness, organization, and completeness.

General Guidelines

1. Each page must have your name, and page number at the top.
2. Identify what the project is, either by problem number or some other way.
3. Staple all of the sheets together before turning them in.
4. All pages should be done on 8 ½ x 11 paper. The preferred paper for homework and take home quizzes is green engineering calculation paper, which is available in the bookstore or local office supply stores. Ordinary lined notebook paper is not the paper of choice, and should be avoided if at all possible. Plain white paper or other grid paper is also acceptable. Plain white paper is the preferred paper for reports and computer printouts. Under no circumstances should spiral bound paper torn out of a notebook, 3 hole paper torn out of a notebook, or any other torn or dirty paper be used.
5. All calculations should include the following:
 - a. A sketch of the system or device.
 - b. A problem statement, including all of the known information and unknowns to be found.
 - c. Free-Body diagrams (where appropriate). All free-body diagrams should be fully labeled with known forces, variables for unknown forces, and dimensions. Include all units.
 - d. Basic formulas – write out the formula before you start substituting in values.
 - e. Substitute known values into the formulas. If there are any possible problems with inconsistent units, include all units at this point.
 - f. Solve the equations. Show all of your work. If you use a computer, include a printout of the work you did on the computer.
 - g. For the final results, include the proper units, direction arrows, etc. as appropriate.
 - h. Box your answer(s), or use some other method to indicate the result.

6. If you use data from any references, include information about that reference, including normal bibliographical information, page number, and table or figure number.
7. Final results should not be shown with a large number of significant figures. If you show a large number of significant figures you are implying that the result is accurate to that many digits. In engineering calculations the known information is rarely accurate to more than 3 or 4 significant figures, usually less, so the results of calculations using that data will be even less accurate. For this course, and as a good general practice, use the following round-off guidelines:
 - a. For results beginning with a 1, use 4 significant figures.
 - b. For results beginning with anything but a 1, use 3 significant figures.
8. Neatness is important. Diagrams do not have to be perfect, but should be clear enough for anyone to understand. All problem statements should be printed legibly. The equations, calculations, and solutions should be legible and neatly organized. Use one side of the page only.

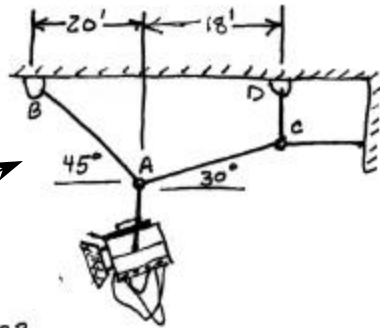
Attached you will find a sample problem. All of the key elements of the calculation are indicated. Anything you turn in should be similar to this example.

Heading

MR EDWARDS

SAMPLE PROBLEM 1

PAGE 1

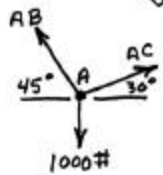


Diagram

THE CABLE SYSTEM SHOWN SUPPORTS A 1000# BANK OF LIGHTS ABOVE A MOVIE SET.

FIND THE TENSION IN EACH CABLE.

Problem Statement



Show Calculations

$$\sum F_x = 0$$
$$AC \cos 30 - AB \cos 45 = 0$$

$$AC = AB \left(\frac{\cos 45}{\cos 30} \right)$$

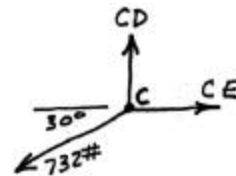
$$\sum F_y = 0$$

$$AB \sin 45 + AC \sin 30 - 1000 = 0$$
$$AB \sin 45 + AB \left(\frac{\cos 45 \sin 30}{\cos 30} \right) = 1000$$

$$AB = 897 \# (T)$$

$$AC = 897 \left(\frac{\cos 45}{\cos 30} \right)$$

$$AC = 732 \# (T)$$



Free Body Diagrams

$$\sum F_x = 0$$

$$CE - 732 \cos 30 = 0$$

$$CE = 634 \# (T)$$

Formula

Substitution

$$\sum F_y = 0$$

$$CD - 732 \sin 30 = 0$$

$$CD = 366 \# (T)$$

Result

Helpful Tips for Homework and Take Home Quizzes

1. Do not wait until the last minute to do your work.
2. Do the problem on your own. If you work with others your thinking will not be fully challenged, and you may find that the tests will be more difficult than intended.
3. If you do work in a group, do as much of the work as possible on your own before talking to the group, and then, only get ideas how to proceed. Do not just copy.
4. On graded problems, working in a group can be detrimental to your grade. If everyone in the group gets the right answer, then it may be difficult to detect. However, if everyone in the group gets a similar incorrect answer, then everyone risks receiving a zero for their efforts.
5. Grades on graded homework and take home quizzes will be based on many things, including diagrams, correct selection of formulas, substitution of correct values into the formulas, general neatness and organization, math, interpretation of results (where appropriate), and whether or not you show all of your work. It is possible to have an incorrect answer and receive a passing grade, but it is also possible to have a correct answer and receive a failing grade. Much of the grade depends on the approach you take to the work.
6. Set a reasonable time limit for each problem. If you can't get the answer in that amount of time, set it aside, and move on to another one. After you have tried all of the problems, then retry the troublesome one.
7. Work slowly and deliberately. Rushing things will cause careless mistakes, and can cause more time to be taken in the long run trying to find your errors.
8. Use homework problems in the manner in which they are intended, as learning tools.
9. Do not be shy about seeing me for help. You can stop in my office during regular office hours or any other time I am there. You can also stop in the chatroom at the listed hours that I am there. I will give you as much help as you need with regular homework. On graded problems, the only help I can give you is to clarify something in the problem that might be confusing you.
10. Keep current. If you get behind in your homework it is very difficult to catch up later.