MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Civil and Environmental Engineering
1.060 Engineering Mechanics II

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A Few Hints on Problem Solving

a) Make a sketch to define the problem (even if the problem comes with one).

b) Be as neat as possible. Neatness is often interpreted as clearness of thoughts by the person who corrects your solution (even when your solution is wrong). Besides it makes life easier for that person. Either way you can not lose.

c) Use the sketch to define variables; e.g. indicating forces by arrows, name the arrows, and put them on your sketch in the direction you expect the forces to act (then if their numerical values come out positive the force direction is as you expected; if they come out negative you were wrong either in your initial assumption of the force direction or in your calculations and a check would be appropriate).

d) Whenever a new variable is introduced define it, unless you use standard notation (it is not necessary to define ρ = density but if you call it "d" you better say "d is for density" or something like that).

e) Whenever you have to make an assumption such as dropping a term in an equation, state your reasons for doing it and justify it. If you do not do this, the person correcting your solution might get the impression that you are totally unaware of the existence of the term you dropped.

f) As you proceed with your solution do so in general terms. Call gravity g, density ρ, discharge Q, etc. When you have obtained your solution (expressed in terms of variables) a check of dimensions may avoid gross errors in your formulation of the problem, e.g., you might find that dimensions are off by (lenth/time^2) so you probably forgot a "g" somewhere.

g) Once you have obtained your solution in general terms (or carried the solution as far as you can in this mode) state the numerical variable in a consistent set of units, e.g SI, and then evaluate your solution. Remember that your numerical answer has units! Check the physical realism of your results, e.g., if you predicted a water velocity of 100 m/s you might have multiplied rather than divided by "g" somewhere and a check of your algebra would clear this up. If you can not find an error, state that you do not like your answer and why.

h) Never hand in two solutions to the same problem unless both solutions are correct and give essentially the same result. If you hand in two different solutions you show that you have no preference and you leave the choice up to the person correcting the solutions and s/he might choose the worse solution or take points off for both solutions if they are both wrong. The choice is yours. One solution only.

Some Additional Hints *(when you do not have plenty of time)*

1) Read the complete problem statement before your start. Some may want to read the entire quiz before starting. Pay attention to the weight given to different problems (if so indicated) and allot a portion of the total available time to a particular problem commensurate with its weight.

2) If you do not have a clear idea about how to get started, and if no idea comes to mind after a reasonable time, go to another problem (but return to the problem you left behind before time is up for the reasons given below in 3). This applies also if you get stuck in the middle of a problem.

3) Do not leave any problem or part of a problem untouched. If time is running out at least jot down a few words and/or sketchy calculations showing how you would proceed if you had time. If nothing is said no credit can be given.

4) To the extent possible follow the same rules that apply when you have plenty of time. In particular point out if dimensions do not match or if numerical values appear unrealistic (even if you do not have time to go back and look for the error).