PH202-1G
Spring 2014

How to solve a physics problem

Draw a picture

Draw a diagram or plot to visualize what is happening in the problem.
If the problem involves multiple forces, draw a free-body diagram.
You may need to draw a before picture and an after picture.

Identify known and unknown quantities

Label quantities on your diagram *using symbols*. No numbers!
Circle any unknown quantities you are asked to solve for in the problem. What units do you expect for your answer?

Think about the concepts and general principles involved

What concepts that you have learned so far involve the quantities in this problem?
Are you dealing with forces? Fields? Energies? What do you know about them?
Can you apply any general principles, e.g. conservation of energy or Newton's laws?
Write down any relevant equations or definitions.

Solve for the desired unknown quantity symbolically

Use the equations you wrote down in the last step to connect quantities in the problem.
How can you use the equations to go from one quantity to another?
Use algebra to solve for the desired unknown quantity *using symbols*. No numbers yet!
If you get stuck, think about units. How can you manipulate the quantities given in the problem to get the units expected for the answer?

Plug in values and calculate

Once you have solved for the desired unknown quantity symbolically, plug in the values given in the problem.
If you need to use constants, use two more significant figures than the least significant value in the problem.
If possible, put everything into your calculator in one step. Only solve for an intermediate value if it simplifies the problem significantly. This reduces rounding errors and helps you see if anything cancels.

Check your answer

Do you have the correct units? If not, what do you need to do to get the correct units?
Does your answer make sense? Does the scale of your answer match the scale of the problem?
If you plug your answer back into an equation you used, can you get the same quantity given in the problem?