Seven Steps to Solving Physics and Astronomy Problems[1]

1. Analyze the question. Read it carefully. Find definitions for any terms you don't understand. If appropriate, make a clear drawing. What does the question *ask for*? What information is *given*?

2. Find a *link* – an equation, an idea, a drawing – which connects what you are given to what you seek. The link may be indirect. Suppose, for instance, you were asked to find the kinetic energy of an asteroid given its density, radius, and speed. Since $KE = mv^2/2$, you need m and don't have it. But mass = volume $\times$ density, and volume can be found from radius. Thus, the link is indirect: $r \rightarrow V$; V and $\rho \rightarrow m$; m and $v \rightarrow KE$.

3. Set up and simplify any algebraic equations (By "simplify", I mean cancel common factors and solve for the unknown you seek).

4. Check the algebra – do the dependences make sense? That is, if your equation is $KE = mv^2/2$, do you expect more energy in a more massive body? (Yes); in a faster moving body? (Yes).

5. Only then, if appropriate, plug in numerical values, keeping track of units on all quantities.

6. Check the arithmetic, using common sense (If the KE of an asteroid comes out 0.73 Joules, you're wrong).

7. Review your work; think over, and if necessary, state and justify any assumptions you had to make. Use common sense again.

[1] originally from Bruce Partridge, Haverford College