

## The Care and Feeding of a Physics Problem Set A Checklist for Students

1. **Start with a basic equation.** In each chapter, I will indicate which are the basic equations. These equations represent fundamental physics principles. You are expected to start with these equations; simply pulling an equation from an example will not receive full credit.
2. **Explain your work clearly, in English.** Do not simply repeat in words what your equations say. Instead, explain why the equation you chose is relevant to the problem at hand. If you need to combine several equations to solve a problem, explain the relationships between them or how you are combining them.
3. **Have a high E/M (English/Math) ratio.** This is the same as rule number 2, but is so important it's worth repeating.
4. **Indicate your assumptions explicitly.** What physical approximations are you using? Is the problem open to interpretation? If so, explain your interpretation.
5. **Define your variables.** Don't assume we know what you mean with each variable. When in doubt, define.
6. **Include proper diagrams whenever possible, especially free-body diagrams.** Don't underestimate how much drawing a diagram can clarify the problem. For any problem where you apply Newton's laws, you **must** draw a free-body diagram, or you will receive half credit.
7. **Solve the problem symbolically.** You **must** arrive at an equation of the form "desired quantity = expression in terms of other variables" before plugging in numbers. If you do not, you will receive half-credit.
8. **Use a reasonable number of digits.** No matter how many digits your calculator gives you, your answer must have significant digits consistent with the precision of the numbers in the problem.
9. **Apply the "Gravity Does Not Point Up" test.** Think about your final answer. If it is completely unreasonable, rework the problem or at least explain why it cannot be right (you may receive additional partial credit for doing so).
10. **Get your units right.** Units are easy points and serve as a check that you answered the correct question.

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