

SIX STEPS TO SOLVING PHYSICS PROBLEMS

A practical guide for written solutions

Use this structure on every problem.

For selected journal problems, write the reasoning out in full — not just the final answer.

1 UNDERSTAND THROUGH PHYSICS

- Sketch a diagram and describe the situation in your own words.
- Name the physical principles involved; break multi-stage problems into phases.

Ask yourself: What's physically happening here?

2 IDENTIFY EQUATIONS

- Choose equations because they connect to the principles you named.
- Be ready to explain why each equation applies.

Ask yourself: Which equations represent these physical principles, and why do they apply?

3 ADAPT TO CONTEXT

- Assign symbols; match knowns to unknowns.
- Make signs and coordinates explicit and stay symbolic.

Ask yourself: What do I know, what don't I know, and how are they connected?

4 SOLVE SYMBOLICALLY

- Keep variables visible — don't substitute numbers yet.
- Carry out the mathematical solution clearly and check dimensions.

Ask yourself: Are the dimensions correct, and does the dependence on each variable make sense?

5 COMPUTE THE ANSWER

- Only now substitute numerical values.
- Check units, sign/direction, and order of magnitude.

Ask yourself: Did I substitute the values correctly and keep track of units, sign, and direction?

6 EVALUATE & REFLECT

- Don't stop at a number — step back and assess the solution as a whole.
- Use physical sense, limiting cases, or another method as a check.

Ask yourself: Does the result make physical sense? What happens if a variable becomes very large, very small, or zero? Is there another way to check or solve it?

The six steps make the reasoning process explicit, not just the final answer.

REMEMBER: Physics before equations • Symbols before numbers • Reflection after the calculation

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