

Driscoll's Exam Guide

Here are some pieces of advice for when you study for the physics exams.

- Try not to panic. If you are in “panic mode,” the studying you do won't be as efficient. Only part of your brain will concentrate on the actual studying, while the rest will tell your fingers to tap on the table frantically or to twirl your hair. At this point, studying for the exam should only be a review of what you have learned so far. If it's the night before the exam, and all semester you have not really studied the material, then you can panic away. One night of cramming won't do you any good anyway.
- There will most likely be three problems on the exam. Do not expect to see exactly the same problems you solved in your homework or the ones in the “Work in class.” A student who has learned physics is not expected to regurgitate the solution to a problem. The student should understand the concepts studied and be able to apply them to situations similar to the ones seen in homework or on the “work in class.” (By “similar” I do not mean “same problem with different numbers” or instead of a “box sliding down the plane” dealing with a “crate sliding down the plane.”)
- After you read a problem, please write down what physics concept you need to apply. It will earn you some credit. Then look at the formula sheet I provided and decide which equation you need to apply. Do not start to frantically write down all the formulas you think may come in handy. On one hand, you have limited space for the solution, and on the other hand, a clutter of equations tells the grader that you don't really know what you are doing. *Then, do not immediately start plugging in numbers and reach for your calculator.* Work with variables and get to the final expression before plugging in the numbers. It's not just poor physics, but it is also a waste of time. Some of your variables may cancel out by the time you reach the final expression, so you would have wasted time, say, multiplying and dividing by 2.54×10^{-15} .
- Under no circumstances should you say “I don't know this variable, so I'll assume it's equal to 1 (or 5, or whatever).” My reply to you would be “I don't know what this work is, so I'll just assume that it's worth 0 points...” (Ok, I'm not that heartless...) If, say, part (b) of a problem makes use of the answer in part (a), and you were unable to find part (a), then leave the variable in place, assume it's known, and find the answer in terms of it (e.g. $v = 5m/s + 3.2m/s^2t_a$.)
- Your work on the exam should be self-explanatory. I won't give you extra points after the exam if you come to me and say “Well, here I meant to say that” Write what you mean on the exam; don't try to explain it to me afterwards. It's not meant to be an oral exam after the fact.
- Read the problems thoroughly. Do not come to me after the exam and say “I thought the problem said ... so this is what I solved for.” The problem says the same thing for everybody in the class. I won't grade “Variations on a Problem.” If you have questions about the wording, ask them during the exam.

- Now to one of my pet peeves. Many a student has come to me crying after the exam and said “I don’t know why I did so poorly on it. Look at my homework grades. I did great on those.” Homework grades to me are not a reflection of your knowledge in physics. The only reason you get graded on homework, is so that you actually (find a way to) do it. I said “find a way” because I realize that a maximum of 20 percent of the students in the class actually struggle with the homework on their own and get it. Don’t get me wrong - it is not a crime to ask for help. By all means, do ask for help if you spend more than 10-15 minutes understanding a problem. Here’s the thing. If somebody explains the problem to you and you write it down, you won’t actually learn it. For every problem you get help with, you should try solving another problem that is similar to that one *on your own*. Look at the problems in the textbook immediately preceding or following that problem, and try those. The next day, go back and try to solve the problem you had help with on your own. Do not try to remember exactly each step. Do not try to regurgitate it. *Think it through*.
- Conversely, do not think that if you get good grades on homework you will do well on the exam, also. You will if you are actually able to solve all the homework problems on your own, and not just from memory.
- I will provide you with a formula sheet for each exam. I will hand out the sheets in advance, so that you have time to familiarize yourself with them. *Do not bring the practice sheets to the exam. You will get brand new ones the day of the exam.* You can (should) make notes on the take-home formula sheets, identifying the various concepts that the formulas pertain to. Then, try to solve some random problems from the textbook, using only the formula sheet. Aim towards the one-star problems from the book.
- Show your work on the exam. **You will get no credit for just giving an answer, even if the answer is correct.** Here is an example of the “flow” of a solution I expect to see on the exam:

Concept: Conservation of energy (no friction)

$$E_i = E_f$$

$$KE_i + PE_i = KE_f + PE_f$$

$$\frac{1}{2}mv_i^2 + mgh_i = \frac{1}{2}mv_f^2 + mgh_f$$

Then solve for whatever it is you need. Only plug in numbers at the very end, after you obtained an expression for the quantity you are looking for. One way to check whether you are on the right track is to do dimensional analysis. Make sure the the units work out. When you get the numerical answer, ask yourself if it makes sense. If you get a speed of $3.5 \times 10^{15} \text{m/s}$ for a skier at the bottom of the hill, you should realize that the answer makes no sense. Write that down. If you don’t have time to recheck your work, say that your answer makes no sense, but that you don’t know where you went wrong. Doing this will impress the grader, and you will get some brownie points.

- Get a good night of sleep before the exam. Staying up until the wee hours of the morning will do you no good. You need a rested mind to perform well on any exam.