How The Class Fared

1. Total scores and grades

Taking both lecture sections together, the average and median total percentage scores were respectively 76.2% and 77.7%, with a standard deviation of 12.0%. This made the average and median letter grades both C+ on our fixed (non-curved) grading scale. Here are the distributions of total percentage scores and letter grades, in histogram form.
2. Do your homework.

Your homework turned out to be worth up to a third of your grade, not 5% of your grade, if you account for its influence on other parts of your grade. Here’s why.

Homework was worth 5% of the total percentage score in PHY 122; that is, a perfect score on the homework would have raised a total percentage score by 5% compared to a zero homework score. However, as the homework is designed to prepare students for the exams, we expected that good homework scores would be associated with an even larger improvement in the final grade compared to bad scores, and indeed this is what we saw. Below we plot total percentage scores against homework percentage scores and show that, on the average, a perfect homework score was worth 33% more than a zero: homework wields an influence on the total score that is almost a factor of seven larger than its official share of the total score. Statistically this is an extremely strong result: the correlation coefficient of the linear trend is 0.57, and the probability of obtaining a linear correlation of this magnitude from a random sample as large as our class is really tiny: $2 \times 10^{-20\%}$. (That is, if total scores were not related to homework scores, a total-to-homework trend this strong would be seen once every $5 \times 10^{19}$ PHY 122 classes with $N = 243$ students, on the average.) The largest contributor to low homework scores was simply not handing in the homework, rather than receiving low scores on submitted work.

This is not an isolated result. In science and engineering classes in general -- even in classes designed for non-science majors -- homework performance has an influence on overall performance which is much larger than its weight in the final grade accounting. So, as we always warn classes at the beginning of each semester: don’t neglect homework, thinking it to be an insignificant part of the grade. What you learn while doing your homework exerts a lot of leverage on the larger shares of your grade.

3. The rich get richer

The PHY 122 Final Exam featured two 10-point extra-credit problems. Given that the exam was worth 40% of the grade and there were 94 other points on the test, the extra credit represented an
opportunity to improve a total percentage score by as much as 8.5% \((= 40\% \times 20/94)\) -- which would convert the lowest C into a B-. The test was designed so that most of the class could complete the whole thing, extra credit and all, in the two hours allotted. The extra credit was intended especially as a reward for those students who, by dint of hard work as the semester went on, had finally put it all together and were ready to crush problems on the final that gave them trouble on the midterms. Of course those who had put it all together earlier in the semester would also tear through the extra credit, but it would not change their grades much.

If our wishes to help PHY 122's Middle Class had been granted, there would be a substantial number of students with pre-final-exam total scores in the 60-80% range who would have received lots of points on the Final Exam's problems 4 and 8. Alas, there were not enough students in this category to pull the average score received on these problems above a token 3-4 points out of the 20 possible. As a polynomial regression (shown below) demonstrates, it took total scores exceeding 80% to receive more than token credit, and the further above 80% a student had, the more (extra) credit s/he earned, on the average. So our extra-credit problems did more to convert A-s into As then they did to convert Cs into B-s.

(Any appearance of similarity between extra credit and economic stimulus, and between PHY 122 grades and personal income, is accidental. After all, those who receive the top grades aren't banksters. They do not lend or invest their points in other students' PHY 122 enterprises. Do they?)