META

Distributions, Variance, Inequalities, Confidence Intervals

1 General Comments

1. Important Questions
   - 1.1 - 1
   - 1.1 - 3,5 are esp. Good
   - #5 on pg. 9
   - 4 in continuous distributions
2. They should be decently familiar with Markov/Chebyshevs Inequalities so make sure to focus on those, and that they are comfortable with them moving on. They are tested quite often
3. I think its good to present confidence intervals as an application of the inequalities, which should make it more intuitive. Up to you, whatever makes most sense to you and your students
4. Conditional Expectation is difficult. This will be covered in lecture Friday, so students will not have seen it, or be very confused about it. Make sure to prepare an explanation
5. Continuous has the lowest priority due to it being covered (most likely) after Thanksgiving
6. Make sure they understand why we integrate/derive when to manipulate between CDF/PDF
7. Just like the intro to RVs recently, have them be comfortable with defining continuous RVs

8. Move onto continuous distributions only if you have time. I think its intuitive to present them as the continuous analogs to their discrete counterparts but again, do whatever works best
9. Make sure they understand why we use the values that we use for PDFs/CDFs A lot of the problems here are just plug and chug, so shouldnt be too difficult

2 Questions

2.1 Conditional Expectation

1. **Intro**
   - Draw a picture to show that conditioning creates a new random variable with a new distribution. Below, Figure 9 of note 26 does so by defining a random variable $\mathrm{E}(Y|X)$, which is a function of X. $\mathrm{E}(Y|X)$ is a random variable because giving $\mathrm{E}(Y|X)$ an outcome makes X return a number, from which $\mathrm{E}(Y|X)$ (which is a number) can be calculated. I.e. $\mathrm{E}(Y|X)$ is a composition of a function on X and a function on the outcome space. I.e. $\mathrm{E}(Y|X): \rightarrow R$