1819W MA481

Course Rubric

Questions regarding the development and application of theory can be challenging because a part of you feels like writing a book report and "throwing up on the page" (stating every vocab word you have ever heard of in hopes of saying something close to the right answer for enough credit). The other part of you wants to do the bare minimum to get credit, making it tempting to cut corners and not justify steps. Fundamentally, an instructor can only grade what you communicate, and a large part of this class is communicating - often both challenging concepts as well as technical mathematical steps. There are different things that need to be communicated based on the type of question. Therefore, this page provides a guide both in how your solutions will be graded but also in how to best answer various questions. The page is divided by the type of question that you might be asked.

Derivation Questions:

Derivation questions are those which ask you to derive/compute a particular value, potentially using computer code. Note: a "value" need not be a numerical response but could be an expression in terms of unknown or known parameters.

- If code is required, the relevant computer code/output should be provided.
- The solution should be justified by sufficient relevant work and/or written explanation.

The phrase "sufficient relevant work" implies at a minimum that the final answer alone is insufficient. You must, at a minimum, state what you are trying to solve, the formula(s) used, and indicate why the simplifications at each step are reasonable (when those simplifications are beyond algebraic manipulation). A good rule of thumb is that if we were to hand your solution to another student, could they replicate and explain your work without needing to consult you?

Establishing Properties / Additional Theorems:

Whether you are establishing properties or proving an additional theorem, you will be making an argument for a particular statement. Proofs are essentially a combination of derivations and essay responses.

- Argument must be justified by sufficient explanation and computations (if applicable).
- The progression of the argument should be coherent, linking each step in the argument together.
- Any assumptions should be explicitly stated. Write your proof so that if your proof were separated from the statement being proven, a reader could write down the statement by reading your proof.
- Grammar and punctuation should be correct.
- Use precise, specific language. Avoid using vague words like "it" or "the random variable." Instead, give the name of the object to which are you referring; e.g., "the random variable X."
- Do not include irrelevant detail.
- You do not need to restate definitions covered in class within a proof.
- Notation can vary from person to person; be sure it is clear what you are referring to.
- Strings of equations with no explanation are unacceptable, as are random words or sentences with no logical connection.
- Every assertion should be supported by something covered in class (or homework) or derived in the problem.

It is important to note that the text surrounding the mathematical expressions is equally (if not more) valuable. Use this text to ensure that each step forms a coherent thought and logical gaps are not present in your argument. Don't assume a result is "clear;" take time to justify it.

Applications:

Applications involve proofs and derivations, often combined with data and a specific context. While not always the case, applications may ask for conclusions. In addition to the criteria listed above for derivations and proofs, you should adhere to good practice which may pertain to your problem.

If a graphical summary is provided at any point, it should adhere to the following:

- The graphic provided addresses the question of interest.
- The x-axis is clearly labeled.
- The y-axis is clearly labeled.

- The legend has clear labels.
- Any additional requests made in the directions are provided (such as the use of color, etc.).

If you make a conclusion from the analysis, your conclusion should adhere to the following:

- A statement about whether there is "evidence" to support the alternative or not (or whether a statement is "reasonable" depending on the question).
- The statement must be **in the context of the problem**. That is, do not use statistical jargon ("reject the null") or mathematical symbols (even if previously defined).
- "Evidence" must be supported by citing a p-value or confidence interval.
- The p-value (or confidence interval) must be appropriately applied.
- A statement must be given how the p-value or confidence interval was used to reach the conclusion.

In general, any time you "justify your answer," your response should adhere to the following:

- The response should answer the question posed.
- The response should supply relevant facts from the context.
- The response provides implications of those facts based on the course content.
- The response links implications to the answer.
- The response does not include irrelevant facts.
- The response uses logic which is correct.

Rubric:

Each of the above questions will be graded on the 4-point scale.

- 4 - Complete response
  - A response which adheres to all requirements for that type of question.
- 3 - Substantial response
  - A response which adheres to nearly all requirements for that type of question.
  - This often is the result of *one* of the following: leaving out a small piece of information, not linking thoughts together fully, making a small error in the misuse of words while keeping intent intact, or adding additional incorrect information.
- 2 - Developing response
  - A response which adheres to less than half the requirements for that type of question.
  - This is often the result doing *two* of the following: leaving out a small piece of information, not linking thoughts together fully, making a small error in the misuse of words while keeping intent intact, or adding additional incorrect information.
  - Or, this could be the result of doing *one* of the following: leaving out a critical piece of information, not linking thoughts together at all, making a fundamental misuse of terminology leading to intent being changed.
- 1 - Minimal response
  - A response which has at least one element which is correct but missed the key ideas being tested in the problem.
  - This is often the result of misunderstanding the problem or misapplying concepts from class.
- 0 - Incorrect response
  - A response which is not described above.

Last modified: Sunday, November 25, 2018, 7:03 PM