Math 24
Winter 2017
About Reading Quizzes

Each reading quiz will consist of one or two true/false questions on the day's reading. You will know in advance a list of questions from which the quiz questions will be taken. For example, the first reading quiz questions will come from Section 1.2, exercise (1).

You must answer each question with T or F and a brief explanation of your answer. Since the T/F answers are generally available at the back of the book, the explanation counts more than the answer.

Your explanation need not be long, and it need not be a complete sentence. However, it should have some relevant and correct content.

Below are some examples of hypothetical questions that could be asked about Appendix C, the appendix on fields that we began reading in class, with acceptable and unacceptable answers.

True or False? The additive identity of a field is unique.
Answer: True.
Acceptable explanations:
"Theorem."
"Proven in book."
"Can prove from field axioms."
Unacceptable explanations:
"Book says so."
"By definition."
Notes: This is a theorem, meaning it is proven from the axioms for a field. All three acceptable explanations essentially say this. Other words for things that can be proven are proposition, lemma, and corollary. While these four words mean somewhat different things, and you should try to use them appropriately, you will not lose points for mixing them up on a reading quiz.

"Book says so" is unacceptable because it has insufficient content; it says nothing about why the statement is true.

"By definition" is unacceptable because this is *not* part of the definition of a field. It is something we prove from the definition. While you will not lose points on a reading quiz for calling a theorem a lemma, or vice versa, you *will* lose points if you mix up definitions and axioms, on the one hand, with theorems and lemmas, on the other. There is a key difference between things we get to decide as parts of the definitions of concepts, and things that follow from those definitions. See the next example for the opposite situation:

True or False? Every field has an additive identity.
Answer: True.

Acceptable explanations:
"By definition."
"Definition of field."
"Axiom."
Notes: This is part of the definition of a field (it is one of the field axioms), so these explanations are correct.

True or False? Every element of a field has a multiplicative inverse.
Answer: False.
Acceptable explanations:
"Zero has no multiplicative inverse."
"In $\mathbb{Q}$, zero doesn't."
"Correct version: Every nonzero element of a field…"
Unacceptable explanations:
"Correct version: Every element of a field has an additive inverse."
"Correct version: It is not the case that every element of a field has a multiplicative inverse."
Notes: An understood part of these assertions is generally "always," or "every," as in "It is always the case that every element of a field has a multiplicative inverse," or "Every element of every field has a multiplicative inverse." Therefore, a good way to explain why the assertion is false is to give a *counterexample*, a specific case in which it is not true. The second explanation here is actually better than the first, since it gives a very specific counterexample.

Some T/F questions are misstated versions of definitions or theorems. In this case, giving the correct statement, as in the third acceptable explanation, is appropriate.

The first unacceptable explanation is unacceptable because it is not sufficiently relevant; the given statement is about multiplicative inverses, not additive inverses.

The second unacceptable explanation is unacceptable because it has insufficient content; it's just another way to say the statement is false.

True or False? The integers $\mathbb{Z}$ are a field.
Answer: True.
Acceptable explanations:
"Not all elements have multiplicative inverses."
"2 has no multiplicative inverse."
"The multiplicative inverse axiom fails."
Unacceptable explanation:
"It doesn't satisfy all the field axioms."
Notes: The second acceptable explanation is the best, because it gives a specific counterexample.

The unacceptable explanation does not have enough content; not satisfying the field axioms is really no different from not being a field.