MTH 350 Weekly Practice 8 Due: 11:59pm ET Sunday, 14 March

Directions:

- Complete the exercises below and either write up or type up your solutions. Solutions must be submitted as PDF or Word documents, uploaded to the appropriate assignment area on Blackboard.
- If you choose to submit handwritten work, it must be neat and legible; if you do your handwritten work on paper, it must be **scanned to a PDF file** and submitted to Blackboard. Instructions and practice for scanning work to PDFs is given in the Startup Assignment. **Do not just take a picture, and do not submit a graphics file (JPG, PNG, etc.)** — such submissions will not be graded.
- Your work will be graded using the EMPX rubric and evaluated **not just on the basis of a right or wrong answer, but on the quality, completeness, and clarity of your work**. Therefore you need to show all work and explain your reasoning on each item.
- Every item must have a good-faith effort at a complete and correct response. If any item is left blank, or shows minimal effort (such as answering "I don't know"), or is significantly incomplete, the entire assignment will be graded "X" (Not Assessable) and you will have to spend a token to revise it.

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1. Consider the set $R = \{A, B, C, D, E\}$. Define addition + and multiplication $\times$ on this set by the operation tables:

+	A	B	C	D	E
A	E	A	B	C	D
B	A	B	C	D	E
C	B	C	D	E	A
D	C	D	E	A	B
E	D	E	A	B	C

$\times$	A	B	C	D	E
A	A	B	C	D	E
B	B	B	B	B	B
C	C	B	E	A	D
D	D	B	A	E	C
E	E	B	D	C	A

   (a) Is R closed under addition? Under multiplication? Explain how you know.

   (b) Is there an additive identity? If so, what is it? Explain how you know.

   (c) Is there an multiplicative identity? If so, what is it? Explain how you know.

   (d) Is addition commutative? Is multiplication commutative? Explain how you know.

   (e) Does every element have an additive inverse? State the additive inverse of each element that has one.

   (f) It's too much work to give a full proof that addition is associative, but do two examples to test whether or not this is the case. (Pick three elements; what do you need to do with them to see if addition is associative?)

   (g) Repeat the previous question with two examples demonstrating that multiplication is associative.

   (h) Repeat the previous question with two examples demonstrating that multiplication distributes over addition.

   (i) What do all of the above items suggest about the set R with these two operations?

2. In the system described in the first question:

   (a) Does every element other than the additive identity have a multiplicative inverse? List the ones that do not have a multiplicative inverse. And for each one that has a multiplicative inverse, state what the multiplicative inverse is.

   (b) Solve the equation $Cx + D = E$ or else explain why there is no solution.

3. Access the MTH 350 Grade Checklist found on Blackboard in the *Syllabus and Calendar* area, and update it using the information currently on Blackboard. Along with the work for this Weekly Practice, submit a PDF of that completed/updated Checklist. Then in the writeup for your Weekly Practice, give a 2-4 sentence summary of your progress toward the grade you want in the class; mention the items you still need to accomplish in order to earn that grade, as well as your overall plan for doing so.