Math 113(4) - Comments for HW12

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November 19, 2018

Some general comments:

1. Please use staplers or clips, not just fold the left-upper corner of papers!
2. Try to write well! - maybe this will be harder than the first one...
3. If you can, try to use LaTeX.
4. For questions that requires proofs, I almost not give any partial credits.

Problem 1 (Section 26, Exercise 4)

You have to explain *why* $2\mathbb{Z}/8\mathbb{Z}$ and $\mathbb{Z}_4$ are not isomorphic as rings. If you didn't, I deducted 1 point. The easiest way to figure out is that there's no multiplicative identity in $2\mathbb{Z}/8\mathbb{Z}$. I also gave full credits who draw multiplication table of $\mathbb{Z}_4$, but actually you have to explain why it shows that they aren't isomorphic as rings. For example, you can count the number of pairs $(a, b) \in R \times R$ such that $ab = 0$ for $R = 2\mathbb{Z}/8\mathbb{Z}$ and $R = \mathbb{Z}_4$.

Problem 2 (Section 26, Exercise 17)

1. R is a subring of $\mathbb{R}$. (1.5 points)
2. R' is a subring of $M_2(\mathbb{Z})$. (1.5 points)
3. R and R' are isomorphic as rings. (2 points)

Problem 3

1.5 points, 1.5 points, and 2 points for each (a), (b), and (c). You have to explain why the examples you suggested are correct. Otherwise, I deducted 0.5 points for each. It is enough to mention that what is the quotient ring $(\mathbb{Z}\times\mathbb{Z})/I$ for your ideal I and whether it is field, integral domain, or not.

Problem 4 (Section 27, Exercise 24)

A finite integral domain is a field.

Problem 5 (Section 27, Exercise 34)