Math 321 Fall 2016
Homework 9
Due: November 14, 2016

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You are welcome to work together but everyone needs to write up **distinct** solutions. If you use any books outside of our textbook or other people, please make sure to give them credit. Make sure your solutions are complete. If your handwriting is atrocious, I am happy to give you a basic introduction to LaTeX.

1. 17.2
2. 17.7
3. 17.18
4. 17.25
5. Let $S = \{a + bi \mid a, b \in \mathbb{Z}, b \text{ even}\}$. Show that $S$ is a subring of $\mathbb{Z}[i]$ but not an ideal of $\mathbb{Z}[i]$.
6. (a) Give an example of a ring that has exactly two maximal ideals.

   (b) Suppose that $R$ is a commutative ring and $|R| = 30$. If $I$ is an ideal of $R$ and $|I| = 10$, prove that $I$ is maximal ideal.

   (Hint: Rings are abelian groups.)
7. 18.5
8. 18.15
9. 18.23