- From Section 5:
  - Which of the following subsets H are subgroups? Please justify your assertions.
    1. $G = (\mathbb{R}, +)$; $H = \mathbb{Q}$
    2. $G = (\mathbb{C}^{\times}, \cdot)$; $H = \{a + bi : a, b \in \mathbb{R}, a^2 + b^2 = 1\}$. *Hint:* Think about H visually. What shape does it make in the complex plane?
  - How many subgroups of order 2 does $\mathbb{Z}_2 \times \mathbb{Z}_2 \times \mathbb{Z}_2$ have? Please describe them all.
  - Please solve Exercises 5.7, 5.8, and 5.18 from the textbook.
  - In the cyclic group $(\mathbb{Z}_{24}, \oplus)$, find a generator for $\langle 21 \rangle \cap \langle 10 \rangle$.
  - In the cyclic group $(\mathbb{Z}_n, \oplus)$, please give a general formula for the generator of $\langle m \rangle \cap \langle k \rangle$. Please justify your answer.
- From Section 6:
  - Please solve Exercises 6.1 (parts a & d) and 6.3.
  - Can we write D_4 as a direct product of some of its subgroups? Please justify your answer.
  - In the group $\mathbb{Z}_{30} \times \mathbb{Z}_{20}$, how many elements are there of order 15? How many cyclic subgroups are there of order 15?

* Exercise 5.26