

**Introduction to Abstract Algebraic Systems MATH-430-1070 (11365),
Fall 2022**

Exercise Set 10

1. Given are two segments with lengths $r_1, r_2 > 0$. Can the following be constructed using only a ruler and a compass:
 - (a) a circle whose area equals the sum of areas of circles with radii r_1 and r_2 ?
 - (b) a ball whose volume equals the sum of volumes of balls with radii r_1 and r_2 ?
2. Artin textbook problem 8.1, chapter 6.
3. Artin textbook problem 7.2, chapter 7.
4. Artin textbook problem 1.6, chapter 11.
5. Prove that the ideal I_{2+i} in the ring $\mathbb{Z}[i]$ is maximal. Prove that the ideal $I_{3+\sqrt{2}}$ in the ring $\mathbb{Z}[\sqrt{2}]$ is also maximal.