

Exercise Set 7

1. Let  $I_1, I_2$  be two ideals in a ring  $R$ . Prove that the following sets are also ideals:

(a)  $I_1 + I_2 = \{a + b; a \in I_1, b \in I_2\}$ ,

(b)  $I_1 I_2 = \left\{ \sum_{k=1}^N a_k b_k; N \in \mathbb{N}, a_k \in I_1, b_k \in I_2 \right\}$ ,

(c)  $I_1 : I_2 = \{a \in R; \forall b \in I_2 ab \in I_1\}$ .

2. Artin textbook problem 3.6, chapter 11.

3. Artin textbook problem 3.7, chapter 11.

4. Artin textbook problem 4.3 (a), chapter 11.

5. Artin textbook problem 6.8, chapter 11.