Problem 1. (From the book.) Read Chapters 8 and 9. Do the following problems:
Chapter 6 Problem Set, pages 48–49: 8, 17, 19
Chapter 7 Problem Set, pages 55–56: 2, 6, 9, 10, 15, 17
Chapter 8 Problem Set, pages 61–62: 1, 5, 7

Problem 2. Let $n \in \mathbb{N}$ and suppose $n = p_1^{a_1} p_2^{a_2} \cdots p_k^{a_k}$ is the unique prime factorization of $n$ guaranteed by the Fundamental Theorem of Arithmetic.

i. Prove that $d(n)$ is odd if and only if $n$ is a perfect square.

ii. Prove that $\sigma(n)$ is odd if and only if $n$ is a perfect square or twice a perfect square.