Read Artin, Chapter 5, section 9, and Chapter 6, sections 1-6.

From Artin, do these problems:

Section 5.2 (pp.188-189): 15.
Section 5.3 (p.189): 2.
Section 5.4 (pp.189-192): 9, 14.
Section 5.9 (p.195): 7.
Section 6.1 (pp.229-230): 3, 14.
Section 6.4 (pp.230-231): 2, 15.
Section 6.6 (pp.232-233): 2.

Also do the following problems:

1. a) Find all groups of order 35.
   b) Find all groups of order 175.
   c) Find all groups of order 34. [Hint: For which \( n \) is there an element of order \( n \)? For each such \( n \), how many elements can have order \( n \)? If \( g \) has order 17 and \( h \) has order 2, what is \( hgh^{-1} \)?]

2. a) Show that \( \text{Aut}(\mathbb{Z}/n\mathbb{Z}) \approx (\mathbb{Z}/n\mathbb{Z})^\times \), for any positive integer \( n \). [The left hand side refers to automorphisms as a group.]
   b) Let \( G_1 = \mathbb{Z}/3\mathbb{Z} \), and for \( i \geq 1 \) let \( G_{i+1} = \text{Aut}(G_i) \). For every positive integer \( n \) find \( G_n \), and determine which of these are abelian.
   c) Do the same with \( G_1 = \mathbb{Z}/8\mathbb{Z} \).