

(Math 371) Homework 1:

Due September 19, 2006

Exercise 1: Prove Proposition 6.5 from Chapter 5 of Algebra by Artin (p. 179-180)

Exercise 2: Chapter 6 Exercises: 1.4 (p. 229)

Exercise 3: Chapter 6 Exercises: 3.4 (p. 230)

Exercise 4: Chapter 6 Exercises: 4.2 (p. 231)

Exercise 5: Chapter 6 Exercises: 4.6 (p. 231)

Exercise 6: Chapter 6 Exercises: 4.9 (p. 232)

Exercise 7: Chapter 12 Exercises: 6.9 a), b) (p. 487)

Exercise 8: Let $f : A \rightarrow B$ be a homomorphism of abelian groups. Assume there is a homomorphism $g : B \rightarrow A$ such that $f \circ g = id_B$.

(a) Prove that A is the direct sum

$$A = Ker(f) \oplus Im(g)$$

(b) Prove that f and g are inverse isomorphisms between $g(B)$ and B .