(Math 371) Homework 1:
Due September 18, 2007

All Exercises are from *Algebra* by Artin.

**Exercise 1:** Chapter 6 Exercises: 1.4 (p. 229)

**Exercise 2:** Chapter 6 Exercises: 1.14 (p. 230)

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

**Exercise 4:** Chapter 6 Exercises: 4.3 (p. 231)

**Exercise 5:** Chapter 6 Exercises: 4.9 (p. 232)

**Exercise 6:** Chapter 6 Exercises: 4.13 (p. 232)

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

**Exercise 8:** Let $f : A \to B$ be a homomorphism of abelian groups. Assume there is a homomorphism $g : B \to A$ 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 $B$. 