Discrete Mathematics – Test1

1. Let $V_1 = <Z, + >, V_2 = <Z_n, \oplus >, f : Z \to Z_n, f(x) = x \bmod n$, then f is a homomorphism from V_1 onto V_2.

   (Remark: Z is the set of all integers, $Z_n = \{0,1,...,n-2\}$, $\oplus$ is said to be addition module n, defined by $x \oplus y = (x + y) \bmod n$)
2. If $< S, * >$ and $< T, *_1 >$ are semigroup, then $< S \times T, *_2 >$ is a semigroup, where $*_2$ defined by $< s_1, t_1 > *_2 < s_2, t_2 > = < s_1 * s_2, t_1 *_1 t_2 >$.
3. $< Z, + >$ is a group, write the n_{th} power of every integer.
4. Let G be a group, G is a Abelian group if and only if $\forall a, b \in G, (ab) = (aa)(bb)$.
5. Let $S = \{a, b, c, d\}$, $f(a) = b, f(b) = c, f(c) = d, f(d) = a$,and $F = \{f^0, f^1, f^2, f^3\}$, then $< F, \circ >$ is an Abelian group.