1. A subgroup of a cyclic group is cyclic (the group is not necessarily finite).

2. If $G$ is a group and $H$ is a subgroup of $G$, then $aH = bH$ if and only if $a^{-1}b \in H$.

3. If $G$ is a finite group, then the order of every subgroup of $G$ divides $|G|$ (you need to show that every two cosets have the same number of elements, the union of all the cosets is $G$, and two cosets are either equal or disjoint).

4. If $G$ is a group whose order is a prime number, then $G$ is cyclic.

5. $\mathbb{Z}_m \times \mathbb{Z}_n$ is cyclic if and only if $m$ and $n$ are relatively prime.

6. If $N$ is a subgroup of $G$, then $N$ is a normal subgroup if and only if $gN = Ng$ for every $g \in G$.

7. If $\phi : G \to G'$ a group homomorphism, then $\phi$ is one-to-one if and only if $\text{Ker}(\phi) = \{e\}$.

8. The commutator subgroup of every group is a normal subgroup.

9. If $\phi : G \to G'$ is a group homomorphism, then
   \[ G/\text{Ker}(\phi) \cong \text{image}(\phi). \]

10. If $G$ is a group of finite order, then for subgroups $H$ and $K$ of $G$,
    \[ |HK| = \frac{|H| |K|}{|H \cap K|}. \]