Questions

Consider the group of rotations in the plane. It can be thought of as either SO(2) or U(1).
1. What is the dimension of the group?
2. Is it abelian or nonabelian?
3. Is it simple? Semi-simple?
4. What are the irredicible representations?
5. What are their dimensions?
6. How does the decomposition of the direct product of two irreducible representations go?
7. What is the Lie algebra?