1. In order to prove Cauchy’s Theorem, we showed that if \( p \mid |G| \), then there exists an element of order \( p \) in \( G \). Using the same argument, what can you say about the number of elements of order \( p \)? (Give both an answer and an argument to support it.)

2. In each of the following statements, determine if the given \( R_i \subset X_i \times X_i \) defines an equivalence relation on the set \( X_i \).
   
   (a) Let \( X_2 \) be the set of Stanford students, and let \( (x, y) \in R_2 \) if there is some class which appears on the schedules of \( x \) and of \( y \).
   
   (b) Let \( X_3 \) be the set of all subsets of the integers, and define \( (x, y) \in R_3 \) if the set consisting of integers that are in \( x \) but not \( y \) together with the integers that are in \( y \) but not \( x \) is finite. (This set of elements is called the \textit{set theoretic difference of} \( x \) \textit{and} \( y \).

   (c) Let \( X_4 \) be the integers, and define \( (x, y) \in R_4 \) if \( x \neq y \).

   (A previous version of this question repeated a part from the last problem set.)