Ordered Sets Exercises

1) Prove that for the set of positive integers, the relation "m is a multiple of n" is an order relation.

2) Let $X = \{1, 2, ..., 9\}$, ordered by the relation "m is a multiple of n". Find all maximal and maximum elements of this ordered set and its least upper bound in $\mathbb{Z}$.

3) Show that $x \sim y$ is an equivalence relation if $\succsim$ is rational.