

Combinatorics Homework

Homework Due on March 19, 2015

Do the following problems and, of course, give explanation when needed.

1. Let X be finite. Show a relation R on X is a strict weak order if and only if there exists $f : X \rightarrow \mathbb{R}$ such that:

$$xRy \Leftrightarrow f(x) < f(y)$$

2. Suppose R is a partially ordering on a set X . Also suppose the a and b are maximal elements and $a \neq b$.

(a) Show a and b are incomparable.

(b) Show that if $R' = R \cup \{(a, b)\}$ is a partial ordering on X .

3. Let R be a strict partial ordering on X , and $A \subseteq X$. Show that (A, R_A) is a strict partial order.