reflexive: check if (x, x) is in R.

transitivity: for all $(a,b), (b,c)$ in R, check if (a,c) in R

anti-symmetric: $\forall x R y \wedge x \neq y. , \neg \exists y R x.$

partial order: one of the element satisfy all these properties.

total: all

a) largest $\forall x \in A, xRa.$

maximum: $\forall R_1 \in R$ that contains a, $\exists b$ $bRa.$

minimum $aRb.$

smallest. $\forall x \in A, aRx.$