Andy Vo

5) 1. R $\leq$ relation. that is, for $a, b \in \mathbb{R}$, aRb iff $a \leq b$. why not equivalence?

To show equivalence, we must show that a relation is reflexive, symmetric, and transitive.

<u>Reflexive:</u> aRa would mean $a \leq a$. this is true, because for all real numbers, they must be equal to themselves.

<u>Symmetric:</u> We must show $aRb = bRa$, or $a \leq b$ is the same as $b \leq a$. this is false. If a and b are different real numbers, say $a = 1$ and $b = 2$, $a \leq b$ or $1 \leq 2$ is true. However, $b \leq a$ or $2 \leq 1$ is false.

$\therefore$ This relation does not show equivalence because it is not symmetric.

5.2. If R is "xor", show that it is not equivalence.

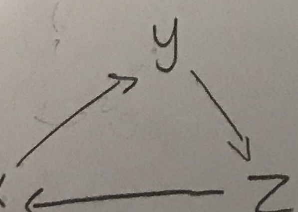
To show equivalence, we must show that a relation is reflexive, symmetric, and transitive.

<u>Reflexive:</u> pRp, $p \oplus p$. $p \oplus p$ is false. "Xor" is "exclusive or", which means that the relation can only be true if one proposition is true and the other proposition is false. For example, if $p = T$ and $q = F$, then $p \oplus q = T$. However, reflexivity means we have two of the same propositions.

$\therefore$ This relation does not show equivalence because it is not reflexive.

5.3. $\{\{0,1\}, \{0,2\}, \{1,2\}\}$

5.4.



R is cyclical iff $\forall x \forall y \forall z (xRy \wedge yRz \rightarrow zRx)$