

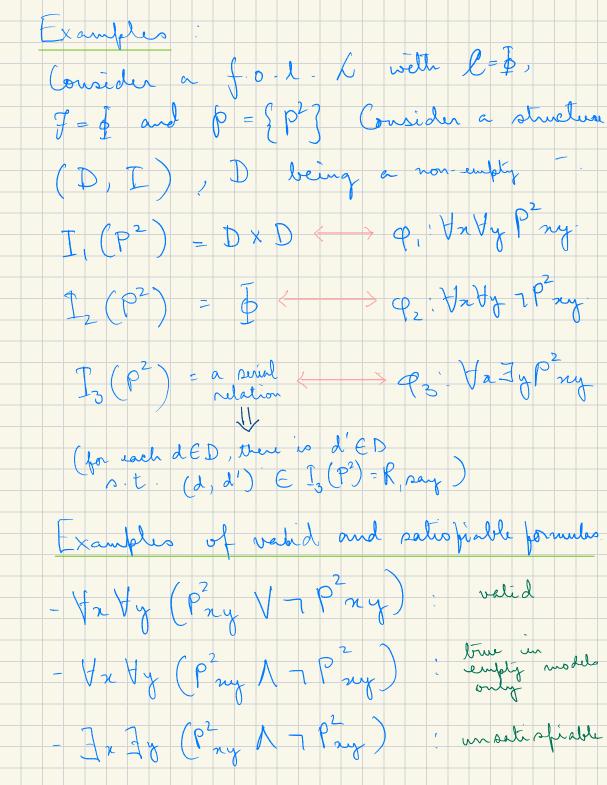
discussion, let us assume that D can be empty as well with such a language we can only talk about sets (as we cannot fent amy structure on these sets). $- \forall x \rightarrow (x = x)$! empty set - In (x = x) i all pets whose cardinality

- In (x = x) \ Haty (n = y) \ in single and in all y

- In (x = x) \ Haty (n = y) \ in all pets whose cardinality - In Jy (7 (x=y) / Hz (z=x /2=y)). sets containing exactly 2 elements sets containing exactly 3 elements Similarly, we can express sets having exactly k elements, for any finite k.

Can we enpress sets containing infinitely many dements ? Please think about it !! (Sementic) Consequence relation: P: a formla = CO(A)XA We say that of is a semantic Consequence of [denoted by [# 9),
If for all models M, M = V for all VE [
imply M = p. Example: T= {p1x -> g1x, g1x -> Rx $\varphi = \rho^{1} \times \rightarrow R^{1} \times$ To show It que her to show for all models M, if M+ M then M+ q.

Take any model M: (D, I, by) To show: MEPIX - RIX. Suppose MFPx. To show: MFPx Since, MFP'x -> g'x, roe have MEg'n. Now, since, MEQ'n = R'2 MER'x. This completes the proof. O Now, suppose that T= J. Then, when we have M F P, we basically have \$ \pm \phi \quad \text{denoted by \$\pm \quad \text{p}} which says p is satisfied by all models. - A formula q is said to be valid if for every model M, M = p - A for mula of is said to be satisfiable of there is a model M, s.t. ME of



1. Let $\Gamma = \{ \varphi, \neg \varphi \}$. Then show

that $\Gamma \neq \gamma$ for all fermules γ 2. Show that if $\varphi \in \Gamma'$, then $\Gamma' \models \varphi$ 3. Let Q be a formula. Then, que valid ill 1Q is not prove a disprove 4. If The and The show that T2 FQ Broof ideas are discussed in class