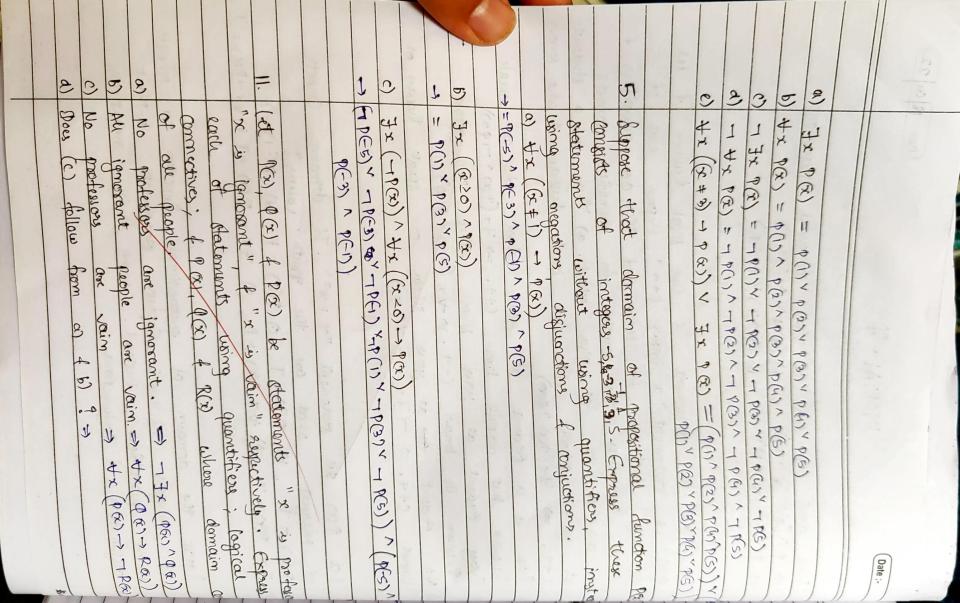
1. Find dual of each of these compound propositions.
a) $p \land (q \lor (r \land T))$ b) $(p \lor F) \land (q \lor T)$ $\Rightarrow a) p \wedge (q \wedge (x \wedge t))$ b) (P^T) Y (P) F) (it PE) be statement "c can speak Russian" of let Q & we statement " x knows C++". Express each of following fentences in terms of P(x), p(x), quantifiers & logical connectives. The domain for quantifiers consists of all Audents at your school a) These is a student at your school who can speak Russian of who knows $(++, \Rightarrow \exists x (pa) \land pa)$ b) There is a student at your school who can speak Russian but doesn't know (++, => 7x (pa) 1 700) c) Every student at your school either can greak

Pussian Or knows (++, => +x (POX POX) d) No student for at your school can speak Russian or knows $C++. \Rightarrow \neg \exists x (Par (\alpha))$ It P(x) be statement " $x = x^2$ ". If domain consists of integers, what we the fouth values? a) p(0) = T, b) p(1) = T, d) p(2) = F, d) p(-1) = Fe) 7x pa = T, A) +x pa = F, g) 7x - Pa = T, b) +x - Pa = T Suppose the domain of propositional function par consists of integers 1,2,3,4,5 Express greatements without wring quantifiers, instead wing only negations, disjunctions of conjunctions.

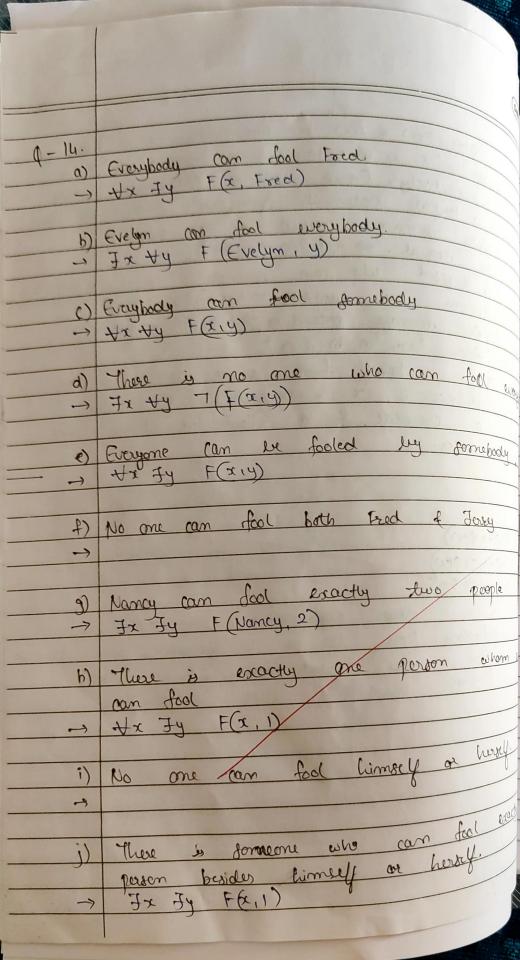


6 Show that to Pas & to Pas & to (Pas & pas) are not logically equivalent. >> let P@): x²<1 + P@): x²≥01 , x ∈ Z. → Here tx P(x) = false of tx P(x) = false.

So tx P(x) \ \tau \ P(x) \ \ \ \ P(x) = False. - Now, tx (P(x) × (P(x)) = True as for all x, any of P(x) or Q(x) will be tale. of to, txpa, y tx pa, and tx (pay pa) are not logically equivalent. +. Show that $\exists x P(x) \land \exists x Q(x) \text{ and } \exists x (P(x) \land Q(x))$ are not logically equivalent. Let $P(x): 2x = y \notin Q(x): 3x + 1 \leq 5$ $x \in Z$. Here Fx PGc) = Prus of Fx P(a) = True. do Jx P(x) ^ Jx Q(x) = True. y Parton Oar will be false 6, Far Par 1 Fx Par and Fre (Par par) are not logically equivalent.

0 52 2 0 C 5 Conjunctions Write サース Don What 71.7 けっと 4 #x 9(x)] integos 79(%) domain \$(x)truth are メンリン Own X+3 22x 1 84 tsuth Conside = Falde 17 - False disjunctions. values = Tour Ax 100) = FIX 900 9(2) False 0 adves where 8 talde Sue 3 Sue Hatements ? integer terms domain 7 9601 tres R Aatements what Higher Date :-Meration N/X

12. Let Pai, Qa, Pa) of sac) be platements "x is baby", "x is logical" "x is also to manage cocordile" of "x is duplisted", respectively. Express each of platements using quantifiers; logical Anternents connectives; of P(x), P(x), P(x) & sox) where domain consists of all people. a) Babies are illogical. $\Rightarrow \forall x (P(x) \rightarrow \neg (P(x)))$ b) Nobody is dispised who can manage a procedite > +x(RE) c) Illegical persons are dispised => +x (-, 0(a) -> (x)) d) Bakes can't manage coolodiles. > + x (P(x) -> T P(x)) e) Does d) follow from a), b) d c)? -) Suppose x is a baby, from premise as x is illogical If from premise c, x is dispised. So, x can't manage à (sociedile, fo d'hollous i.e babies canit manage mocadiles. 0) + oc (P(x) → P(x)) B) → Fx (RQ) → 7000) TH Jx (Pa) -T Pat clear explaination from premise a 1) Suppose x is a I is satisfactory. Now let I be excesse, from premise b some of x are unsatisfactory So, c tollows i.e some becauses are not clear explainations.



	a) No professors are ignorant. = $\forall x (\neg 1)(x) \rightarrow (\neg 1)(x)$ b) All ignorant people are vain. = $\forall x (\neg 1)(x) \rightarrow (\neg 1)(x)$ c) No professors are vain. = $\forall x (\neg 1)(x) \rightarrow (\neg 1)(x)$ d) Does c follows from a d b. Suppose x is a professor from premise a x premise b if x is ignorant x is a person from premise x is a person from premise x is a person from premise x is x in x in x in x in x in x in x is x in x is x in x is x in x i
	b) All ignorant pomple
	c) No poteriors are vaim. = Nx (px)
	d) Does (dollows form Vx (-1760)
-	Suppose x is a professor
	& not ignorant. In the premise a g
	promise by if it is a person from
	premise c follows:
5.	S(x): "X x student" FGY "
	S(x): "x is student" F(x): "x is foculty member" 4 A(x, x, y): "x has asked y a question"
	asica y a question"
(1)	
-	CEAD!
2	
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