If you have questions you are welcome to unmute and interrupt, or ask in chat (publicly or privately is fine!).

If there are any technical difficulties (for example, I am writing offscreen) please let me know right away!

My website is <u>http://www.math.emory.edu/~dzb/</u>

The course website is <u>https://www.math.emory.edu/~dzb/teaching/250Spring2022/</u>

The syllabus is available here https://www.math.emory.edu/~dzb/teaching/250Spring2022/syllabus-math-250-spring-<u>2022.pdf</u>

This Miro board is available at <u>https://miro.com/app/board/uXjVOXdsj9M=/</u>

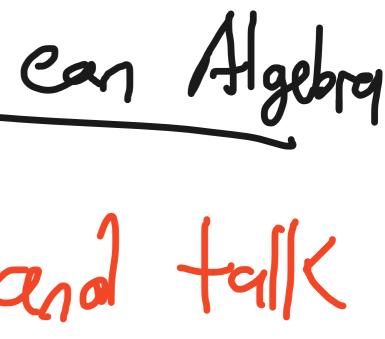
The Overleaf board is available at https://www.overleaf.com/read/ymgbgzsfcrrd

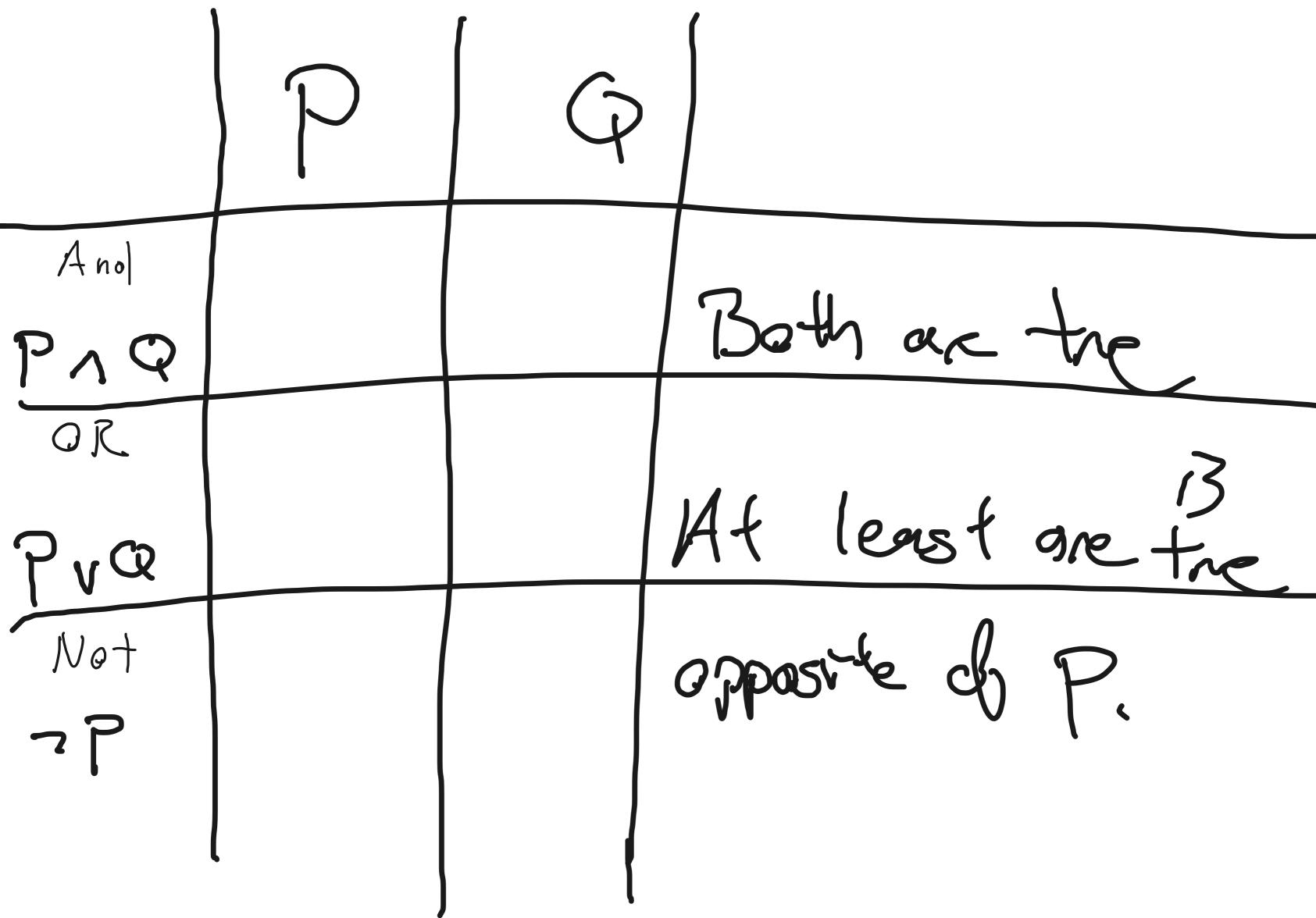
Office hours are Mondays, 4:30-5:30 via Zoom. Link is on the syllabus. If you cannot make it to these office hours, please email me to set up an alternative time. (Preferrably email me 24 hours in advance, and please suggest a big list of times that you are available.)

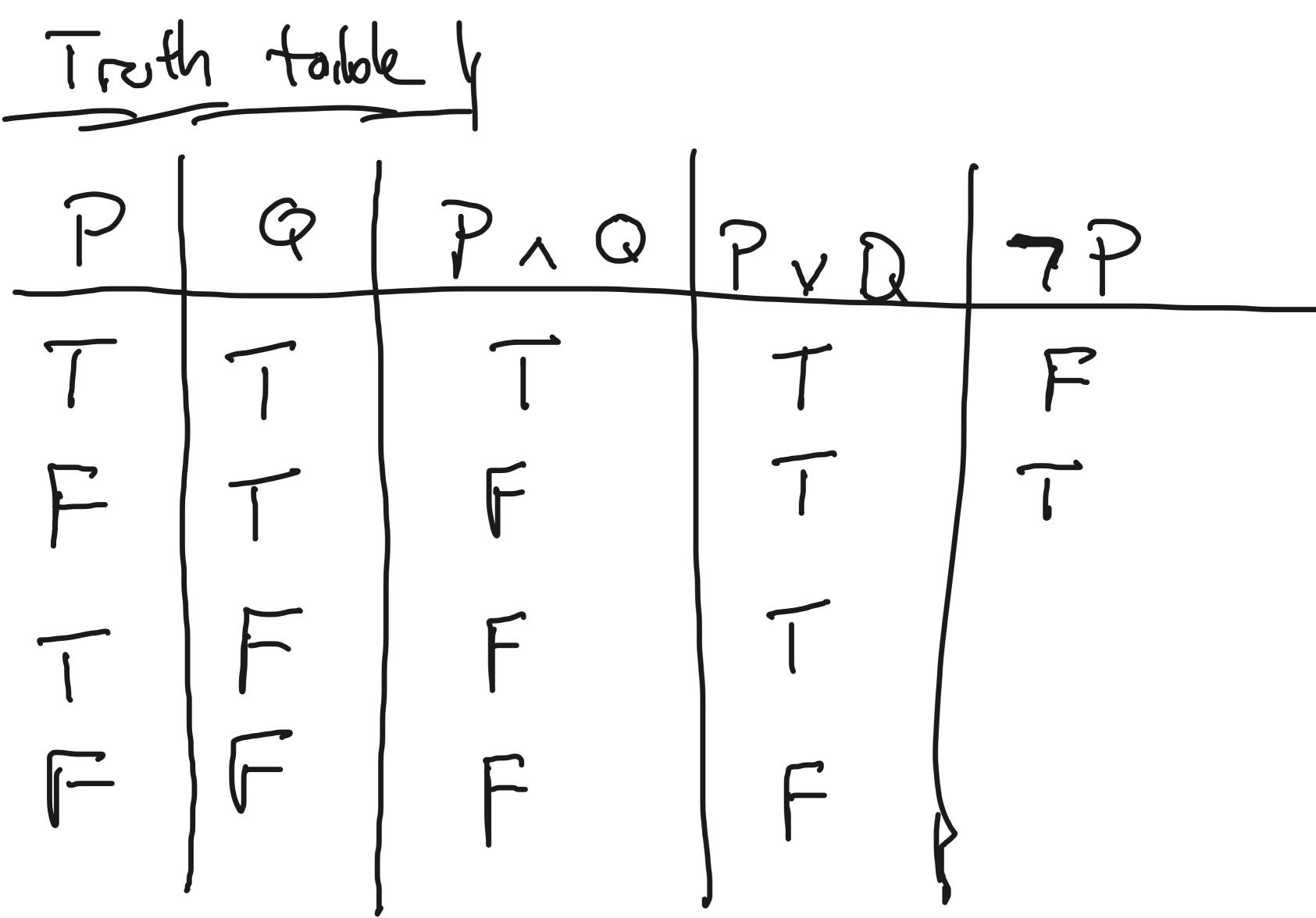
Matying Statements & Boolean Algebra

Use variables to denote and talk about statements,

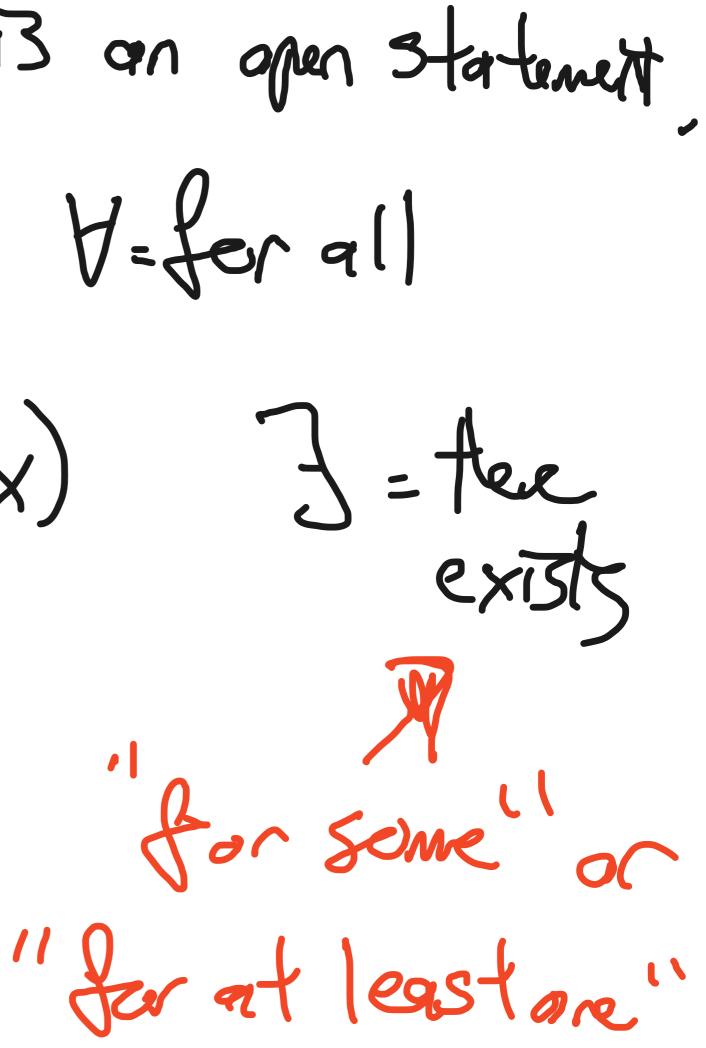
Usundy: PIQIZIS







Quantities: P(x) is an open statement $\forall x, P(x)$ $\forall = \text{for all}$ Jx such that P(x) J=tee exists



P(x) = "x+1 20"Vx (such that x is a real number), x+1>0 Folse Jx s.t. X+1 20. [me] lforal (such that) 1 exi3/5



Implications, or

If P, Hen Q *a*r $P \rightarrow Q$ These all are Pimplies Q Q If P Sen te Serve thing 1Rightanow



C **G** different ways te

Replace P=>Q with "Whenever P B tre, 9 3 true " Wheren IX is real 1/2 20. Ff a and b are even, then at is even.



Ff P B false, ..., whe cares. $P \mid Q \mid P \Rightarrow Q$ TITIENT



To dispre P=>q,

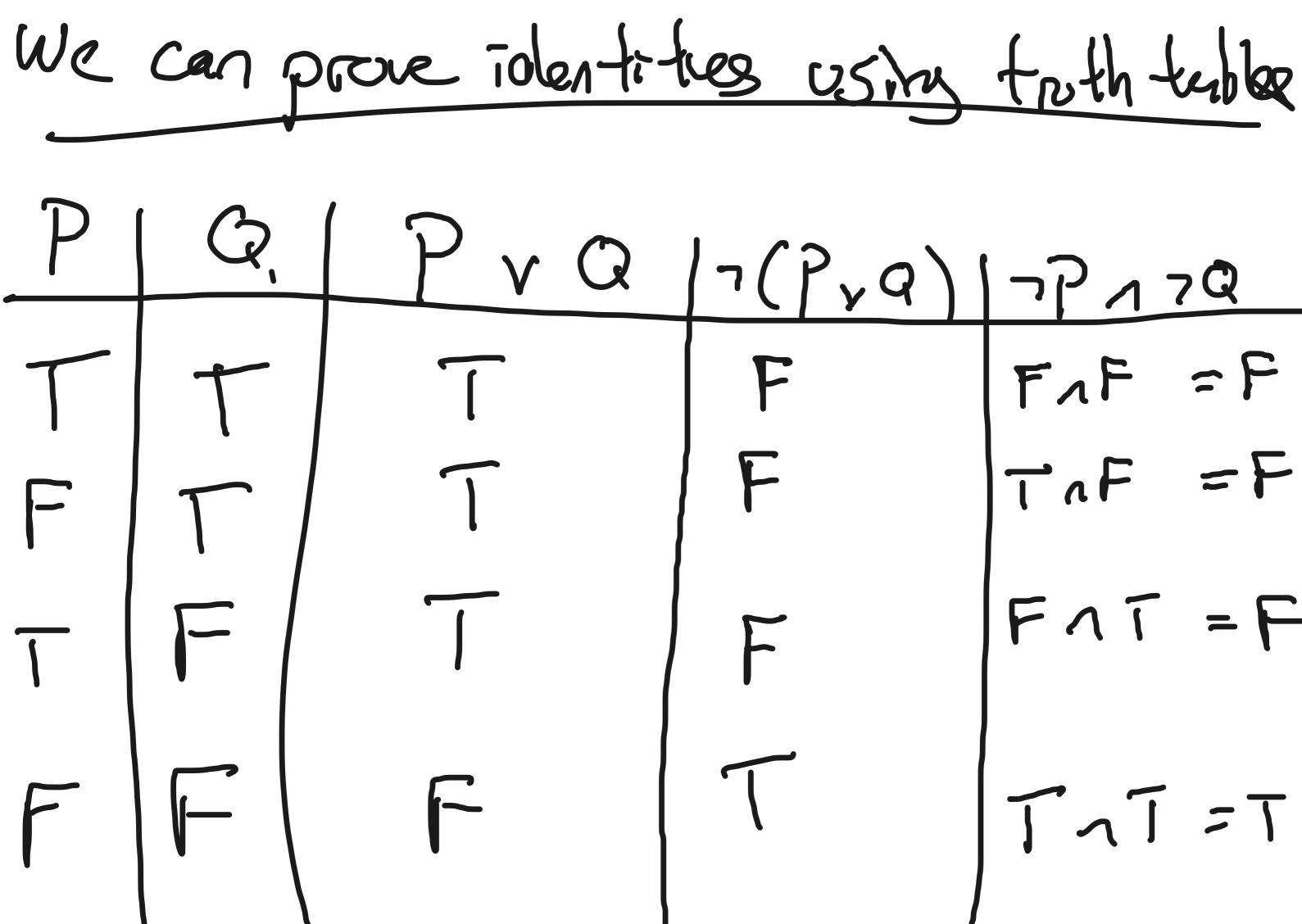
find an example where

PB tre and P Balse

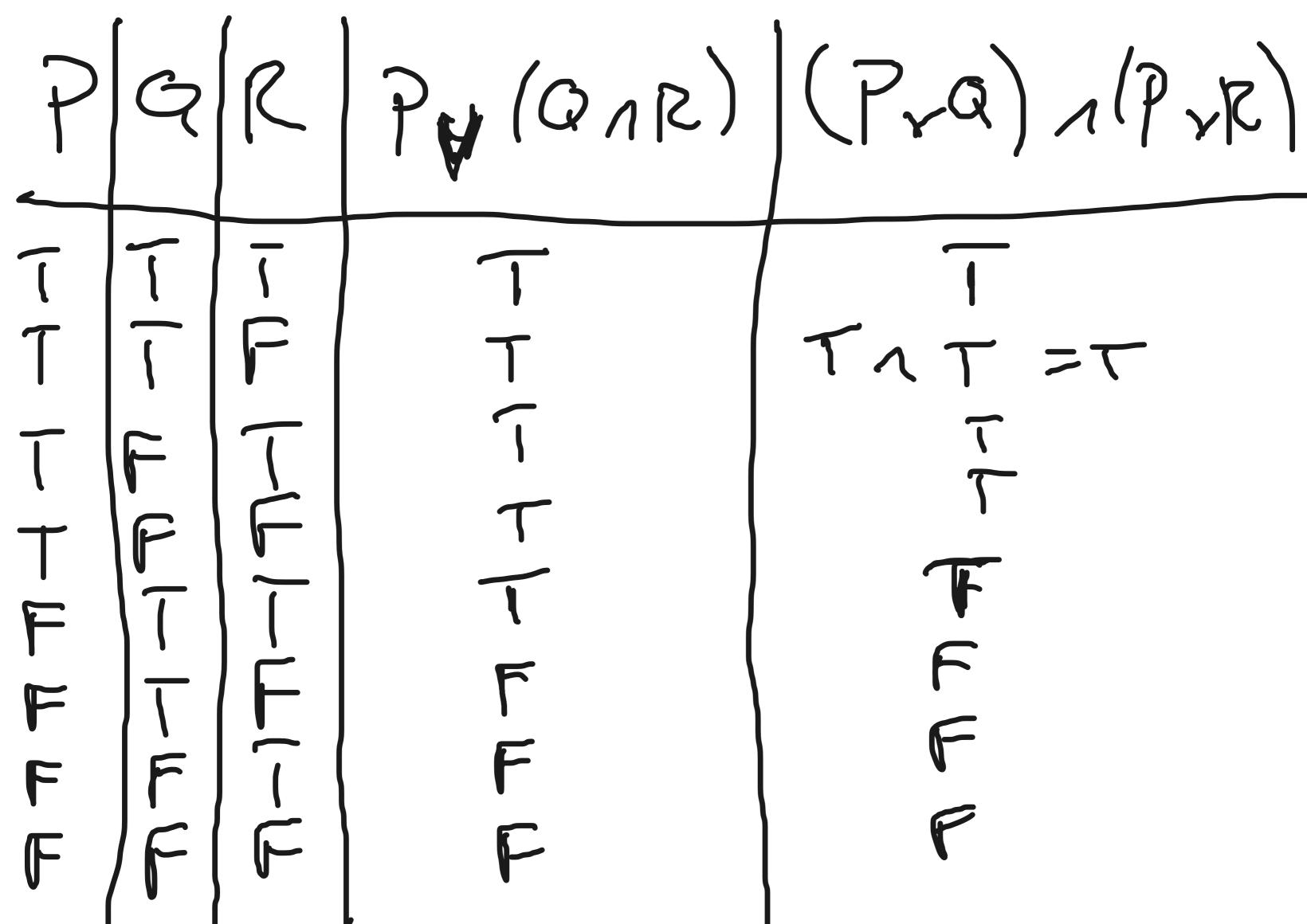
Regatations: Piz tre, 7Piz Jale The regation of P 13 the State ment with the apposite troth valee

Regertion identities 7(PvQ) = zP / 2Q





$\gamma(P_{\gamma}q)|_{\gamma}P_{\gamma}q$ F,F =F =F TrF $F \wedge T = F$ 「
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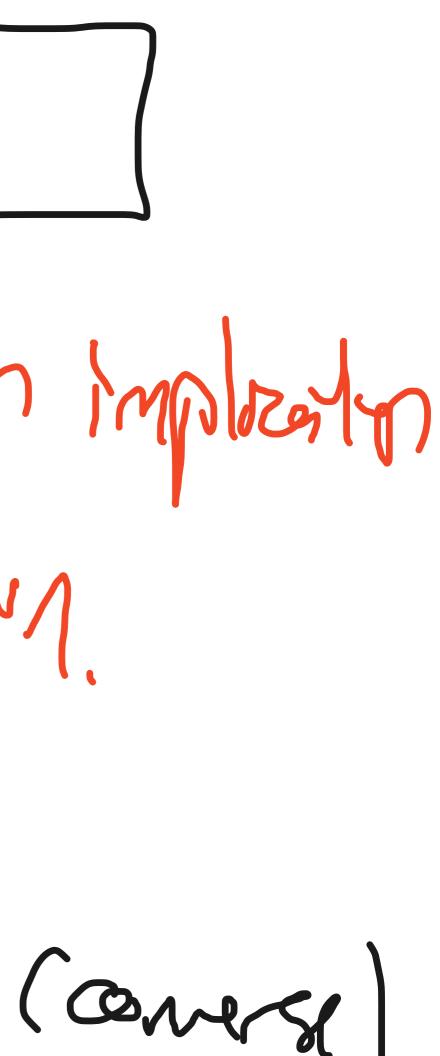
イハT=て F

 $\forall x. P(x) = \exists x s. t. \neg P(x)$ $-(\forall x, \dot{x} > 0) = \exists x s, t, \dot{x} \leq 0$

 $7(\exists x s. t. Q(x)) = \forall x, 7Q(x)$

Think about opposites.

 $\overline{p(P=)Q} = \overline{P/7Q}$ later the regertion of an implication 15 not an implication $2(P=2a) \neq 2P=270$ $\neq Q=2P$ (overse)



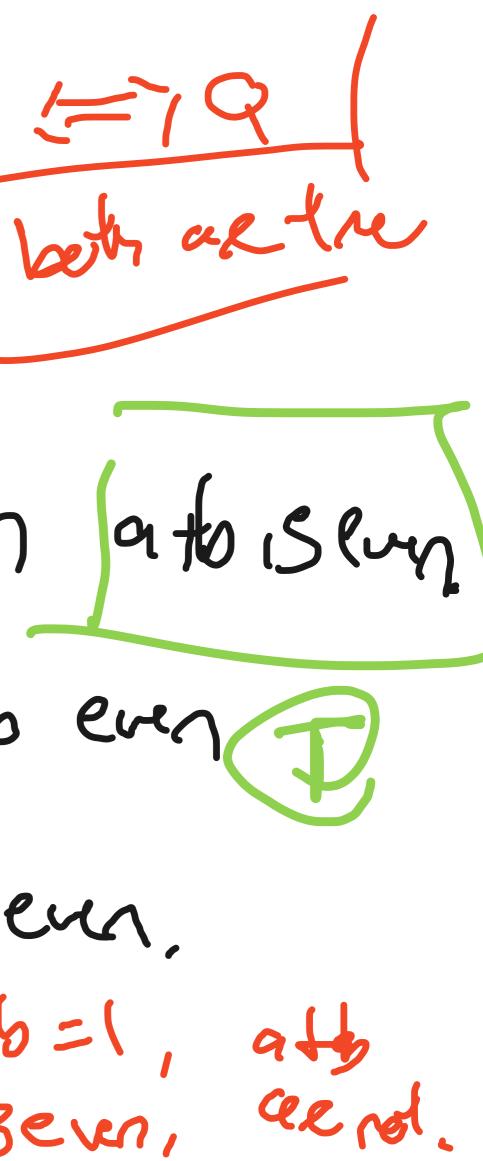
 $\gamma(P=\gamma(QnQ))$ $P \wedge \gamma(G \wedge R) =$ $P(1Q \sim 7R) =$ $(P_{1}, Q) \vee (P_{1}, P_{2})$



n(UX, P(x) vQ(x)) $\exists x s d \tau(P(x) r Q(x)) =$ Jx 5.4. フP(X) ハフQ(X)



 $\gamma = 2 q$ Q = 2 p converse betwarter it a and b are even, then ato server argnolp even => atto even fanul atbein => a and bein. Eble it a so =1, atto atto Beven, arol.



Contry positive. Le P=>Q13 2Q = 27P. They bett have the same regation, つ(っの => っ?) = 7017(-P) = 701P= 7170 = 7(P => 0)



