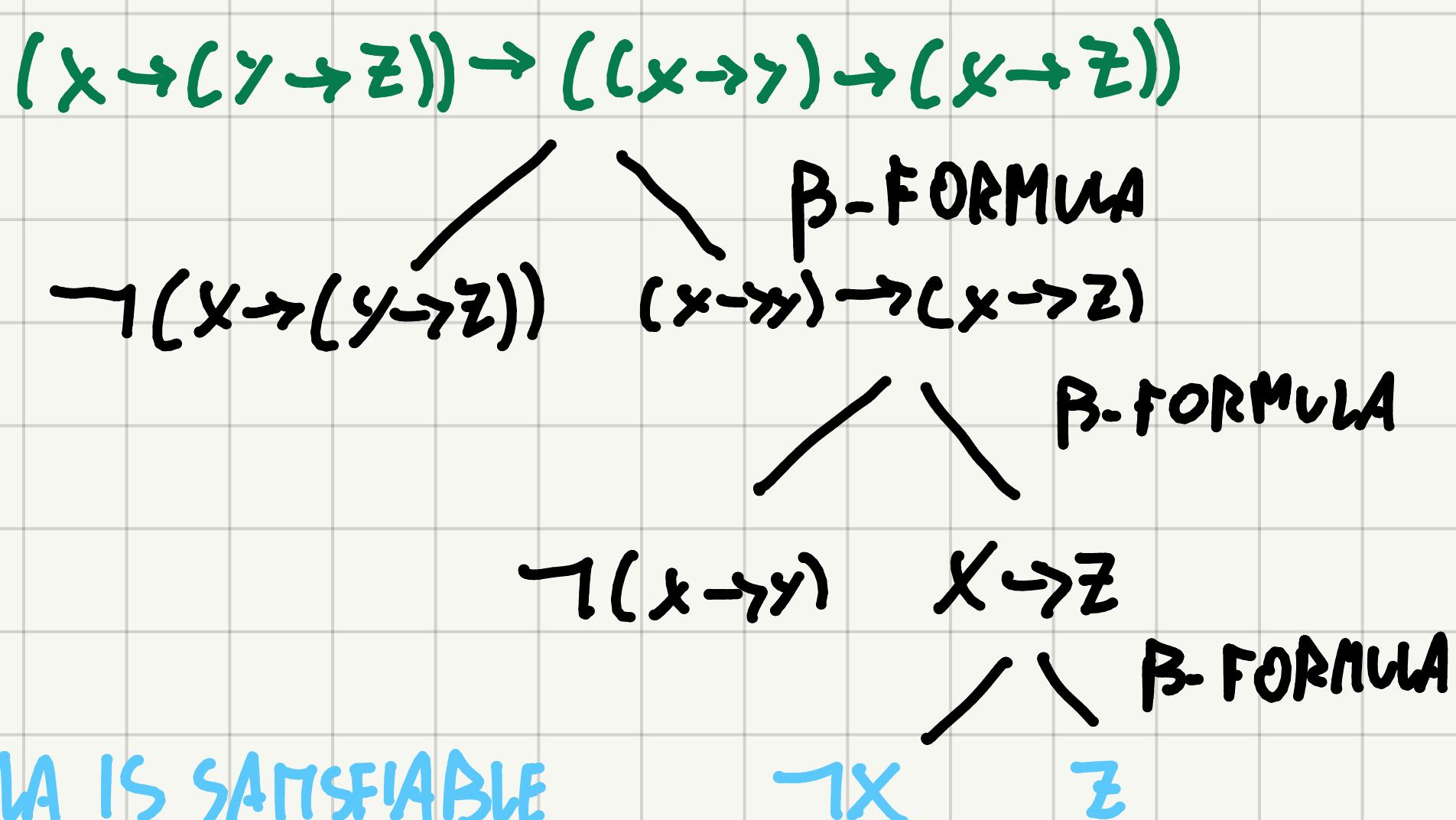


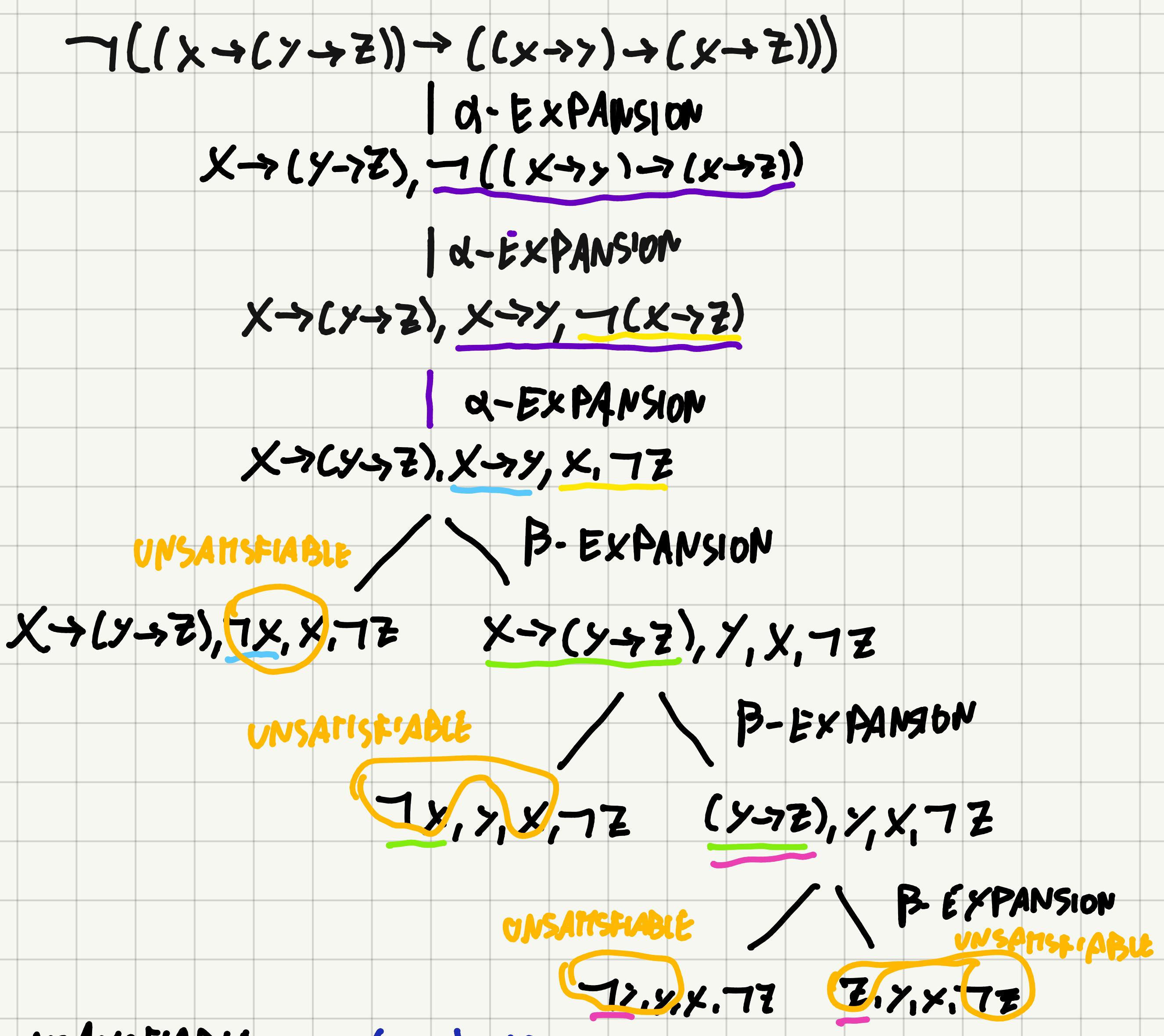
USING SEMANTIC TREE

① CHECK FOR SATISFIABILITY. WE JUST NEED ONE NODE TO BE SATISFIABLE



② CHECK FOR VALIDITY. THE EASIEST WAY IS TO CHECK IF $\neg\varphi$ IS

SATISFIABLE OR UNSATISFIABLE



$\Rightarrow \neg\varphi$ IS UNSATISFIABLE $\Rightarrow \neg(\neg\varphi) = \varphi$ IS VALID

b) $((x \rightarrow y) \rightarrow z) \leftrightarrow ((x \rightarrow y) \wedge \neg z)$

x	y	z	$x \rightarrow y$	$\neg z$	$(x \rightarrow y) \rightarrow z$	$(x \rightarrow y) \wedge \neg z$	φ
0	0	0	1	1	0	1	0
0	0	1	1	0	1	0	0
0	1	0	1	1	0	1	0
0	1	1	1	0	1	0	0
1	0	0	0	1	0	0	0
1	0	1	0	0	1	0	0
1	1	0	1	1	0	1	0
1	1	1	1	0	1	0	0

CONTRADICTION

C) $(X \wedge Y \rightarrow Z) \rightarrow ((X \rightarrow Z) \wedge (Y \rightarrow Z))$

X	Y	Z	$X \wedge Y$	$X \rightarrow Z$	$Y \rightarrow Z$	$X \wedge Y \rightarrow Z$	$(X \rightarrow Z) \wedge (Y \rightarrow Z)$	φ
0	0	0	0	1	1	1	1	1
0	0	1	0	1	1	1	1	1
0	1	0	0	1	0	1	0	0
0	1	1	0	1	1	1	1	1
1	0	0	0	0	1	1	0	0
1	0	1	0	1	1	1	1	1
1	1	0	1	0	0	0	0	1
1	1	1	1	1	1	1	1	1

NEITHER OF THEM