

- 9) i) a) YES $x(0+t+0')$ is not a term
 b) YES ✓
 c) NO ✓

2/3

ii) c) is not a formula ^{or} $x+(0+(y \cdot 0'))$ is not an atomic formula. Why not - where does it fail

1/2
2

iii) $((\forall x(x=0 \leftrightarrow \exists x(x=0 \rightarrow \forall x(x=0))) \rightarrow (x=0 \vee (\forall x(x=0 \leftrightarrow -x=0))))$

Choose 0 as $\forall x(x=0)$
 X as $\exists x(x=0 \rightarrow \forall x(x=0))$

0 as $x=0$
 $((0 \wedge X) \rightarrow (0 \vee (0 \leftrightarrow -0)))$

1	1	1	1	1	1	1	0	0
1	1	1	1	0	1	1	1	0
1	0	0	1	1	1	1	0	0
1	0	0	1	0	1	1	1	0
0	0	1	1	1	0	1	0	1
0	0	1	1	0	1	0	0	1
0	0	0	1	1	0	1	0	1
0	0	0	1	0	1	0	0	1

8

tautology ✓

Ass	Line No	Assertion	Justification
1 ✓	1	$-(0 \wedge -0)$	Ass
1 ✓	2	$(-0 \rightarrow -0)$	Taut(1)
3 ✓	3	$(-0 \vee 0)$	Ass
	4	$((-0 \wedge -0) \rightarrow (-0 \rightarrow -0))$	CP(2)
5 ✓	5	$((-0 \vee 0) \rightarrow (0 \rightarrow 0))$	Ass
1,3 ✓	6	$(0 \rightarrow 0)$	Taut(2),(3)
5 ✓	7	$((-0 \vee 0) \rightarrow (0 \rightarrow 0))$	Taut(5)
1 ✓	8	$((-0 \vee 0) \rightarrow (0 \rightarrow 0))$	CP(6)

Answer