

Foundations of Mathematics

Quiz 4

Name: _____

You have 10 minutes to complete this quiz. If you have a question raise your hand and remain seated. In order to receive full credit your answer must be **complete, legible** and **correct**. When appropriate, show your work and give adequate explanations.

Let $\mathbf{A} = \langle \{0, 1\}; +, \cdot, < \rangle$ be a structure with two binary operations, $+$, $\cdot$, and one binary predicate symbol $<$. Suppose that the tables for the interpretations of $+$, $\cdot$, $<$ in $\mathbf{A}$ are:

$+$	0	1
0	0	1
1	1	0

$\cdot$	0	1
0	0	0
1	0	1

$<$	0	1
0	F	T
1	F	F

1. Create tables for the formulas (a) $((x \cdot y) < (x + y))$, (b) $(\exists y)((x \cdot y) < (x + y))$, (c) $(\forall x)(\exists y)((x \cdot y) < (x + y))$.

(a)	0	1
0	F	T
1	T	F

(b)	0	1
0	T	T
1	T	T

(c)	0	1
0	T	T
1	T	T