Midterm 1 Version 3 Solution

March 19, 2020

Question 1

a. Since $S_1 = \{ab, ba, aab, bba, baa, \dots\}$ and $S_2 = \{aaa, aab, aba, baa, abb, bab, bba\}$,

$S_2 \setminus S_1 = \{aaa, aab, aba, bab\}$

b. See table below

p	q	r	$\neg r$	$p \Rightarrow q$	$(p \Rightarrow q) \Leftrightarrow \neg r$
T	T	T	F	T	F
T	T	F	T	T	T
T	F	T	F	F	T
F	T	T	F	T	F
T	F	F	T	F	F
F	T	F	T	T	T
F	F	T	F	T	F
F	F	F	T	T	T

c. Let $x =$ _____, and $y \in \mathbb{N}$.

We will prove that $P(x)$ is true and $Q(x, y)$ or $Q(x, y+1)$ is false.

Question 2

Question 3

Question 4