

# Midterm 1 Version 1 Review 2

July 17, 2020

1. a)  $aaa, aab, aac, bba, bbb, bbc, cca, ccb, ccc$

b) **Solution:**

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

- c)  $\exists x \in \mathbb{N}, \forall y \in \mathbb{N}, \neg P(x, y) \wedge \neg Q(x, y)$

**Correct Solution:**

Let  $x = \dots$ . Let  $y \in P$ .

We need to prove  $\neg P(x, y)$  and  $\neg Q(x, y)$  are true.

2. a)  $\exists x \in P, Student(x) \wedge Attends(x)$

- b)  $\forall x \in P, \exists y \in P, Student(y) \wedge Attends(y) \Rightarrow Loves(x, y)$

**Correct Solution:**

$\forall x \in P, \exists y \in P, Student(y) \wedge Attends(y) \wedge Loves(x, y)$

- c)  $\forall x \in P, Student(x) \wedge Attends(x) \Rightarrow Loves(x, x)$