MATH 300:01. INTRODUCTION
TO MATHEMATICAL REASONING.
FALL 2015.
QUIZ 1

**1.** (40 points) 1)Find the truth table for

$$P \wedge ((\sim P) \vee Q).$$

2) Using this table find a more simple equivalent formula for this connective.

$P \wedge (\sim P \vee Q)$

| P | Q | $P \wedge (\sim P \vee Q)$ |
|---|---|---|
| T | T | T |
| T | F | F |
| F | T | F |
| F | F | F |

2) $P \wedge Q$.

Typeset by $\mathcal{A}_{\mathcal{M}}\mathcal{S}$-TEX

**2.** (40 points) Prove the equivalence

$$\sim (P \vee (\sim Q)) \equiv (\sim P \wedge Q)$$

without using truth tables.

$\sim (P \vee \sim Q) \equiv \sim P \wedge Q$

De Morgan Law

Double negation

**3.** (20 points) Alice came in a magic country where 2 kinds of people lived: "Trues" always said truth and "Lies" always lied. She met 3 girls: Blond, Red and Green. Alice asked Red, who is she but didn't understood the answer.

She asked 2 other girls: "What did answer Red?".
Blond:" She said that she is True."
Green: "She said that she is Lie."
Who are Blond and Green?

Red answered "I am True".
independent of who she was.
So Blond was True and
Green was Lie
[We can't define who was Red]

MATH 300:02. INTRODUCTION
TO MATHEMATICAL REASONING.
FALL 2015.
QUIZ 1

**1.** (40 points) 1)Find the truth table for

$$P \wedge (P \vee (\sim Q)).$$

2) Using this table find a more simple equivalent formula for this connective.

| P | Q | $P \wedge (P \vee \sim Q)$ |
|---|---|---|
| T | T | T |
| T | F | T |
| F | T | F |
| F | F | F |

2) $\equiv P$.

Typeset by AMS-TEX

**2.** (40 points) Prove the equivalence

$$\sim((\sim P) \wedge Q) \equiv P \vee (\sim Q)$$

without using truth tables.

$\sim(\sim P \wedge Q) \equiv P \vee \sim Q$

de Morgan Law and Double negation

**3.** (20 points) Alice came in a magic country where 2 kinds of people lived: "Trues" always said truth and "Lies" always lied. She met 3 girls: Blond, Red and Green. Alice asked Red, who is she but didn't understood the answer.

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So Blond was True and Green was Lie.
[We can't define who was Red].