

Week 1 Homework:

Section 1.1: 1, 5, 10, 11, 16, 17, 27, 37, 48

#1

- a. Proposition. Truth Value: TRUE
- b. Proposition. Truth Value: FALSE
- c. Proposition. Truth Value: TRUE
- d. Proposition. Truth Value: FALSE
- e. Not a proposition.
- f. Not a proposition.

#5

- a. Steve has less than 100 GB free disk space on his laptop.
- b. Zach does not block e-mails and texts from Jennifer.
- c. $7 \cdot 11 \cdot 13 \neq 999$
- d. Diane did not ride her bicycle 100 miles on Sunday.

#10

- a. The election is not been decided, but the votes have been counted.
- b. The election is decided or the votes have been counted.
- c. The election is not been decided and the votes have been counted.
- d. If the votes have been counted, then the election is decided.
- e. If the votes have been counted, then the election is not decided.
- f. If the election is not decided, then the votes have not been counted.
- g. The election is decided if and only if the votes have been counted.
- h. The votes have not been counted, or the election is not decided and the votes have been counted.

#11

- a. $p \wedge q$
- b. $p \wedge \neg q$
- c. $\neg p \wedge \neg q$
- d. $q \vee p \vee (p \wedge q)$
- e. $p \rightarrow q$
- f. $(p \vee q) \wedge (p \rightarrow \neg q)$
- g. $q \leftrightarrow p$

#16

- a. TRUE
- b. FALSE
- c. TRUE
- d. FLASE

#17

- a. FALSE
- b. TRUE
- c. TRUE
- d. FALSE

#27

- a. Converse: If I ski tomorrow, then it will snows today.
Inverse: If it does not snow today, I will not ski tomorrow.
Contrapositive: If I do not ski tomorrow, then it will not snow today.
- b. Converse: Whenever there is going to be a quiz, I come to class.
Inverse: I do not come to class whenever there is not going to be a quiz.
Contrapositive: Whenever there is not going to be a quiz, I do not come to class.
- c. Converse: A positive integer has no divisors other than 1 and itself only if it is a prime.
Inverse: A positive integer is not a prime only if it has divisors other than 1 and itself.
Contrapositive: A positive integer has divisors other than 1 and itself only if it is not a prime.

#37

- a.

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

b.

p	q	r	$\neg p$	$q \rightarrow r$	$\neg p \rightarrow (q \rightarrow r)$
T	T	T	F	T	T
T	F	T	F	T	T
T	T	F	F	F	T
F	T	T	T	T	T
T	F	F	F	T	T
F	T	F	T	F	F
F	F	T	T	T	T
F	F	F	T	T	T

c.

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

d.

p	q	r	$p \rightarrow q$	$\neg p \rightarrow r$	$(p \rightarrow q) \wedge (\neg p \rightarrow r)$
T	T	T	T	T	T
T	F	T	F	T	F
T	T	F	T	T	T
F	T	T	T	T	T
T	F	F	F	T	F
F	T	F	T	F	F

F	F	T	T	T	T
F	F	F	T	F	F

e.

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

f.

p	q	r	$\neg p \leftrightarrow \neg q$	$q \leftrightarrow r$	$(\neg p \leftrightarrow \neg q) \leftrightarrow (q \leftrightarrow r)$
T	T	T	T	T	T
T	F	T	F	F	T
T	T	F	T	F	F
F	T	T	F	T	F
T	F	F	F	T	F
F	T	F	F	F	T
F	F	T	T	F	F
F	F	F	T	T	T

#48

It is not a proposition, because a statement can be considered inconclusive, which makes such a statement not considered to be a proposition.

Section 1.2: 4, 16, 37

#4

If you pay the daily fee or you are a subscriber to the service, then you can use the wireless network in the airport.

#16

- a. The question “Are you a liar?” does not work, because there are only two answers to that question, making it impossible to tell which cannibal always lies or always tells the truth solely based on their answer since the true answer is unknown to the explorer.
- b. Are you going to eat me if I cannot determine whether you always lie or always tell the truth?

#37

The lady is behind the second door.