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MATH3066
Homework 1
26/4/17

1. (a) The integer 57 is Prime (Well defined False)

    (b) The integer 57 is a Grothendieck prime. (Well defined True)

    (c) London is in England. (Undefined)

    (d) This sentence is False (Undefined)

2. (a) If the sun is shining we are headed to the surf.
    Converse: We are headed to the surf so the sun is shining.
    Contrapositive: We are not headed to the surf so the sun is not shining.

    (b) If I have listened attentively I will do well in the exam.
    Converse: If I did well on the exam I have listened closely.
    Contrapositive: If I did not do well on the exam I have not listened closely.

    (c) It is necessary to have a valid passport to log on to my computer.
    Converse: If I logged on to my computer I had a valid password.
    Contrapositive: If I didn't have a valid passport I have not logged in to my computer.

    (d) Only if my attendance is recorded will I be bothered coming to tutorials.
    Converse: If I am coming to tutorial my attendance is being recorded
    Contrapositive: If I am not coming into tutorials my attendance is not being recorded.

3. (a)

P	Q	$P \Rightarrow Q$	$[P \wedge (P \Rightarrow Q)]$	$[P \wedge (P \Rightarrow Q)] \Rightarrow Q$
T	T	T	T	T
T	F	F	F	T
F	T	T	F	T
F	F	T	F	T

(b)

P	Q	$\sim P$	$\sim Q$	$P \Rightarrow Q$	$\sim Q \wedge (P \Rightarrow Q)$	$[\sim Q \wedge (P \Rightarrow Q)] \Rightarrow \sim P$
T	T	F	F	T	F	T
T	F	F	T	F	F	T
F	T	T	F	T	T	T
F	F	T	T	T	T	T

4. (a)

P	Q	R	$(P \vee Q) \vee R$
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	T
F	T	T	T
F	T	F	T
F	F	T	T
F	F	F	F

(b)

P	Q	R	$(P \wedge Q) \vee R$
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	F
F	T	T	T
F	T	F	F
F	F	T	T
F	F	F	F

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