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Part 1

1. A)

2. D)

3. C)

4. D)

5. D)

Part 2

1.)

a)

P	Q	R	P -> (q -> r)	(p ^ ~r) -> ~q
F	F	F	T	T
F	F	T	T	T
F	T	F	T	T
F	T	T	T	T
T	F	F	T	T
T	F	T	T	T
T	T	F	F	F
T	T	T	T	T

b)

~p v (q -> r) by representation of if then as or

~p v (~q v r) by representation of if then as or

(~p v r) v ~q by associative laws

(~p ^ r) v ~q by De Morgan's laws

~(~p ^ r) -> ~q by representation of if then as or

(p ^ ~r) -> ~q by double negation law

2.

a)

Heathy People = D, People who eat an apple a day = E, a = Alice, x = any person

∀x D(x) → E(x)

E(a)

∴ D(a)

Invalid because of a converse error in logic

b)

Studies discreet mathematics = D Good at logic = E, Bob = b, x = any student

∀x D(x) → E(x)

D(b)

∴ E(x)

Valid by Modus Ponens

3. There are two knaves. A is a knave and it could be either B or C