In-Class Questions 1.4

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P	Q	R	Q AND R	P OR (Q AND R)
T	T	T	T	T
T	T	F	F	T
T	F	T	F	T
T	F	F	F	T
F	T	T	T	T
F	T	F	F	F
F	F	T	F	F
F	F	F	F	F

P	Q	R	P OR Q	P OR R	(P OR Q) AND (P OR R)
T	T	T	T	T	T
T	T	F	T	T	T
T	F	T	T	T	T
T	F	F	T	T	T
F	T	T	T	T	T
F	T	F	T	F	F
F	F	T	F	T	F
F	F	F	F	F	F

Since the last columns match, P OR (Q AND R) is equivalent to (P OR Q) AND (P OR R).

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(a) NOT (L) IMPLIES Q } 1
NOT (L) IMPLIES B }
NOT (L) ~~IMPLIES~~ IFF N

NOT (Q) IMPLIES B } 2
NOT (B) } 3

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(b) ~~By 3,~~ ~~B~~ L = T, Q = T, B = F, N = F

NOT (L) IMPLIES Q becomes F IMPLIES T = T
NOT (L) IMPLIES B becomes F IMPLIES F = T
NOT (L) IFFN becomes F IFF F = T
NOT(Q) IMPLIES B becomes F IMPLIES F = T
NOT(B) becomes T = T

(c) To satisfy NOT(B), B must be F.
To satisfy NOT(Q) IMPLIES B, NOT(Q) must be F and hence Q must be T
To satisfy NOT(L) IMPLIES B, L must be T
To satisfy NOT(L) IFF N, N must be F.

Hence, only one assignment is possible.

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(a) $C_0 = b$, $S_i = a_i$ XOR c_i, $C = C_{n+1}$

$C_{i+1} = a_i$ AND c_i

$0 \le i \le n$

C_i is carry value colem i

(b) $C_0 = 0$ $S_i = a_i$ XOR b_i XOR c_i

$C_{i+1} = (a_i$ AND $b_i)$ OR $(a_i$ AND $c_i)$ OR $(b_i$ AND $c_i)$

$0 \le i \le n$

↓

If more than 2 bits are T, there will be a carry of T.

~~C_{n+1}~~ $C = C_{n+1}$

(c) ~~2 operators for C_0 and C.~~

$(n - 0 + 1) \times 7$ operators $= 7(n+1)$ operators because we have used 7 operators per bit.

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(d) Since all differentiable functions are continuous, if a function is not continuous, then it is not differentiable (contrapositive).

Hence, technically implicative means NOT(C) implies NOT(D), The statement is always true, because if C is true the statement is true by automatically independent of D. So it does not matter whether C or NOT(C) for the mathematician.

For the mother, she most probably would allow her son to watch TV if he does his homework. Hence, the most likely meaning is (NOT(H) IMPLIES NOT(T)) AND (H IMPLIES T), thus

H iff T is the most appropriate

The translation could be different, because the translation is made on the base of intended meaning, not just written sentences.