

CSE 20: Week 1 Homework Solutions

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January 19, 2006

BF: Solutions to 1.3, 1.5, 1.15, 2.3, 2.6 are found in the back of your textbook.

BF 1.13: Is the function $\sim (p \vee \sim q) \vee (\sim p \wedge \sim q)$ equal to the function $\sim p$? Why or why not?

Our proof will use the follow truth table:

p	q	$\sim (p \vee \sim q)$	$(\sim p \wedge \sim q)$	$\sim (p \vee \sim q) \vee (\sim p \wedge \sim q)$	$\sim p$
0	0	0	1	1	1
0	1	1	0	1	1
1	0	0	0	0	0
1	1	0	0	0	0

Since the two function have the same output value for each of the input assignments, the functions are equivalent.

BF 2.7: The solution in the textbook is incorrect. To see this, write out the truth table. The correct answer is $p \wedge (\sim q \vee r)$.

Half-adder Modify the half-adder circuit to use only AND, OR, and NOT gates.

The carry bit c remains $(p \wedge q)$ while the sum bit s can be written as $(\sim p \wedge q) \vee (p \wedge \sim q)$.

Solow: Solutions to 1.4, 2.15, 2.19 and 2.22 are found in the back of your textbook or the website for the textbook (www.wiley.com/college/solow/ .)

Solow 1.5; Let p = "car not fixed", and let q = "miss my interview". We have p implies q , and $\sim p$, where $\sim p$ = "car fixed". Thus Jack statement (p implies q) is true since the hypothesis (p) is false. (See lines three and four of Table 1.1.)

Solow 2.18 R is a subset of S ($R \subseteq S$) implies that for every element x in R , x is also in S . (Note that the statement suggests that $R \subseteq S$ implies that if x is in S then x is in R .) The statement is incorrect since it incorrectly uses the definition of subset.