

Homework: Week 1, Class #1 SOLUTIONS
Discrete Mathematics (Course Number: MTH-129-51)
Prof. G. Safko
Due: Class #2

Page 15: #7
 $m \wedge \sim c$

- Page 15: #8**
- a. $h \wedge w \wedge \sim s$
 - b. $\sim w \wedge h \wedge s$
 - c. $\sim w \wedge \sim h \wedge \sim s$
 - d. $\sim w \wedge \sim s \wedge h$
 - e. $w \wedge \sim(h \wedge s)$

- Page 16: #46**
- a. Commutative Law
 - b. Distributive Law
 - c. Negation Law
 - d. Identity Law

Page 27: #11

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



Identical in both directions to satisfy $p \rightarrow (q \rightarrow r) \leftrightarrow (p \wedge q) \rightarrow r$

Page 41: #4
 \therefore The figure is not a quadrilateral

Page 41: #5
 They did not telephone

In addition:

1) State the contrapositive of:

$$a \rightarrow \sim b \wedge (c \vee \sim d)$$

(Hint: Use DeMorgan's Law)

Answer:

$$\sim(\sim b \wedge (c \vee \sim d)) \rightarrow \sim a \Rightarrow b \wedge \sim(c \vee \sim d) \rightarrow \sim a \Rightarrow b \wedge (\sim c \wedge d) \rightarrow \sim a$$

2) Prove the absorption laws on page 14 (#10) using truth tables

$$p \vee (p \wedge q) \equiv p$$

$$p \wedge (p \vee q) \equiv p$$

Answer:

p	q	$p \wedge q$	$p \vee q$	$p \vee (p \wedge q)$	$p \wedge (p \vee q)$
T	T	T	T	T	T
T	F	F	T	T	T
F	T	F	T	F	F
F	F	F	F	F	F



These rows are identical, so it is true that $p \wedge (p \vee q) \equiv p$ and $p \vee (p \wedge q) \equiv p$ (QED)