Math 22 (9:30am – 10:20am)
Pop Quiz 6 Version B
Wed Nov 16, 2011

NAME YOU ASKED TO BE CALLED IN CLASS: ____________

SCORE: ___ / 6 POINTS

Give the name of the law that justifies each step in the following proof that
if B is a Boolean algebra with operations $+$ and $\cdot$,
then for all $a \in B$, $a + a = a$.

SCORE: ___ / 3 POINTS

PROOF: Let a be any element of B.

$a + a$

$= (a+a)\cdot 1$ LAW: **IDENTITY**

$= (a+a)\cdot(a+\overline{a})$ LAW: **COMPLEMENT**

$= a + a\cdot\overline{a}$ LAW: **DISTRIBUTIVE**

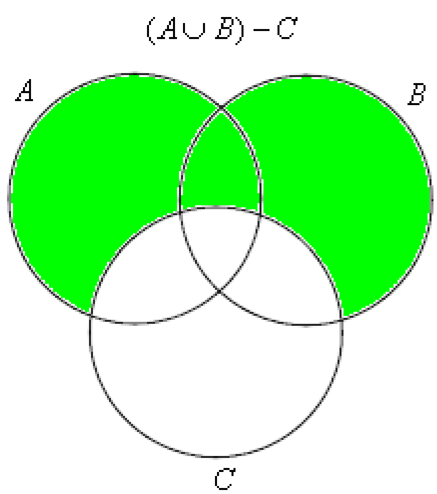
$= a + 0$ LAW: **COMPLEMENT**

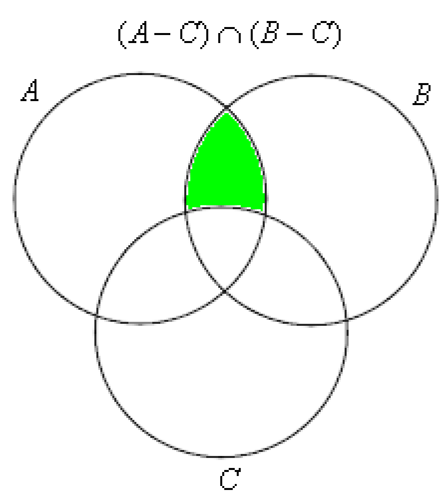
$= a$ LAW: **IDENTITY**

Determine if the following statement is true or false.
If it is true, prove the statement using set algebra/identities. If it is false, disprove the statement.
You may use Venn diagrams to help you determine whether the statement is true or false, but that will not be enough to earn points.

SCORE: ___ / 3 POINTS

For all sets A, B, C which are subsets of a universal set U,
$(A \cup B) - C = (A - C) \cap (B - C)$





FALSE.
If $A = \{1\}$ and $B = C = \varnothing$,
then $(A \cup B) - C = (\{1\} \cup \varnothing) - \varnothing = \{1\} - \varnothing = \{1\}$
but $(A - C) \cap (B - C) = (\{1\} - \varnothing) \cap (\varnothing - \varnothing) = \{1\} \cap \varnothing = \varnothing$