

Solutions to Quiz 1

- (5 marks) 1. Which of the following are correct identities for subsets A, B, C of a fixed set S ? Provide examples if they are not correct or prove using truth tables or Venn diagrams if they are correct.

$$(A \cap B) \cap C = A \cap (B \cap C)$$

$$(A \cup B) \cap A^c = B \cap A^c$$

Solution:

A	B	C	$D = A \cap B$	$F = D \cap C$	$E = B \cap C$	$G = A \cap E$	$F = G$
1	1	1	1	1	1	1	1
1	1	0	1	0	0	0	1
1	0	1	0	0	0	0	1
1	0	0	0	0	0	0	1
0	1	1	0	0	1	0	1
0	1	0	0	0	0	0	1
0	0	1	0	0	0	0	1
0	0	0	0	0	0	0	1

A	B	$D = A \cup B$	A^c	$E = D \cap A^c$	$F = B \cap A^c$	$E = F$
1	1	1	0	0	0	1
1	0	1	0	0	0	1
0	1	1	1	1	1	1
0	0	0	1	0	0	1