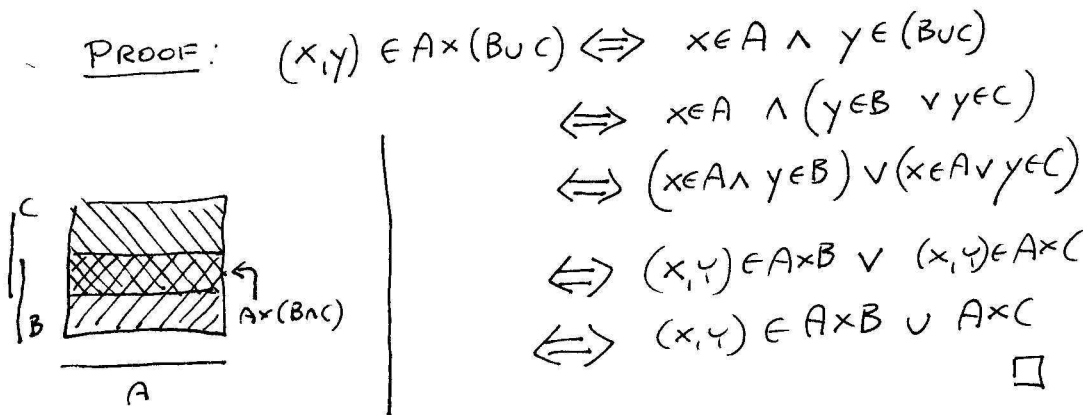


HW 3

1 (i): Thm: $A \times (B \cup C) = (A \times B) \cup (A \times C)$



BY DEF OF "X"
 BY DEF OF "U"
 BY DISTRIBUTIVITY
 IN LOGIC
 BY DEF OF "X"
 BY DEF OF "U"

2. BOTH STATEMENTS ARE FALSE. CONSIDER THIS SIMPLE COUNTEREXAMPLE

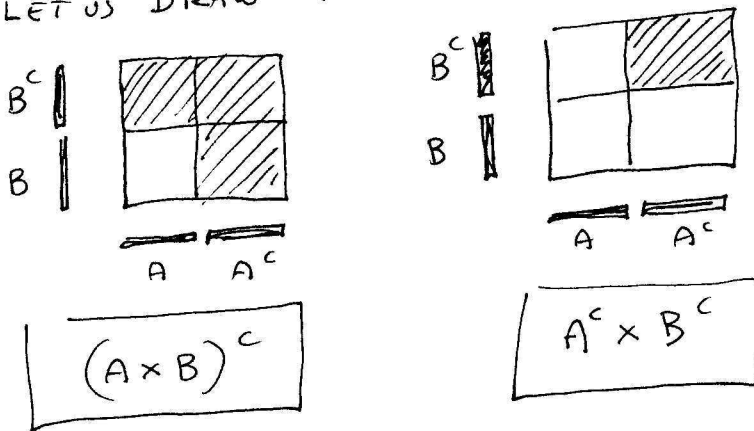
(FOR (i)) LET $A = \{a\}$, $B = \{b\}$ and $C = \{c\}$

Then $A \cup (B \times C) = \{a, (b,c)\}$

while $(A \cup B) \times (A \cup C) = \{(a,a), (a,c), (b,a), (b,c)\}$

The sets are different.

3. LET US DRAW THE TWO SETS.



PROPOSE
 A
 VALID
 FORMULA

A VERY SIMPLE COUNTEREXAMPLE:

$U = \{a, b\}$ (universal set)

$A = B = \{a\}$

Now: $(A \times B)^c = \{(a,a)\}^c = \{(a,b), (b,a), (b,b)\}$

$A^c \times B^c = \{(b,b)\}$