Problem Set 2

Problem 1

(a) Explain how to write a formula Members(p,a,b) of set theory that means p = {a,b}

$$Members(p, a, b) ::= \forall z.(z = a \ OR \ z = b)$$

(b)

$$Pair(p, a, b) ::= \forall z.(z = a \ OR \ z = Members(p, a, b))$$

(c)
Prove

$$z \in \overline{A \cap B} = z \in \overline{A} \cup \overline{B}$$

From the right side,

$$z \in \overline{A} \cup \overline{B}$$

iff

$$(z \in \overline{A}) \ OR \ (z \in \overline{B})$$

iff

$$\overline{(z \in A) \ AND \ (z \in B)}$$

(By De Morgan's law)
iff

$$z \in \overline{A \cap B}$$

which is the left side.

Problem 2