SOLUTION: QUIZ 1

(1)Not possible.

Since for the conditions, $|A_1| > |B_1|$ and $|A_2| > |B_2|$ to hold; $|A_1|$ must be at least $|B_1| + 1$ and $|A_2|$ must be at least $|B_2| + 1$. So, $|A_1| + |A_2|$ must be at least $|B_1| + |B_2| + 2$. Then, $|A_1| + |A_2|$ must be at least 7, since $|B_1| + |B_2| = 5$. In that case, there is no element for A_3.

(2) (i) $\wedge$ (ii) does not exists (iii) *aa* (iv) *bbb* (v) *aaaa*

(3)Basis: $(1, 0) \in S$
Induction: if $(a, b) \in S$ then $(a + 1, b), (a + 1, b + 1), (a - 1, b - 1), (a, b - 1) \in S$.