BASIC CLAIMS AND EXERCISES ABOUT RELATIONS ACCOMPANYING HANDOUT 12 – 2010 - 3

For sets let $U = \mathbb{R}$ and for product sets let $V = \mathbb{R}\times\mathbb{R}$.

Exercise 12 – 3 – 1: Let $U = \mathbb{R}$. Let $A = \mathbb{N}_9^*$. Define the relation, $R \subseteq A \times A$, defined by $R = \{(x,y) \mid x \leq y\}$.

A. Show that R is a partial order on A (or not).
B. Draw the Hasse diagramme for R (if it is a partial order).

Exercise 12 – 3 – 2: Let $U = \mathbb{R}$. Let $B = \mathbb{N}_{12}$. Define the relation, $R \subseteq B \times B$, defined by $R = \{(x,y) \mid x \leq y$ and x is a divisor of $y\}$.

A. Determine if R is a partial order on B (or not).
B. Draw the Hasse diagramme for R (if it is a partial order).
C. Find the set of maximal elements of B under the order.
D. Find the set of minimal elements of B under the order.
E. Find the greatest element(s) of B under the order.
F. Find the least element(s) of B under the order.

Exercise 12 – 3 – 3: Let $U = \mathbb{R}$. Let $B = \mathbb{N}_{12}$. Define the relation, $S \subseteq B \times B$, defined by $S = \{(x,y) \mid x \leq y$ and x is an even multiple of $y\}$.

A. Determine if S is a partial order on B (or not).
B. Draw the Hasse diagramme for S (if it is a partial order).
C. Find the set of maximal elements of B under the order.
D. Find the set of minimal elements of B under the order.
E. Find the greatest element(s) of B under the order.
F. Find the least element(s) of B under the order.