BASIC CLAIMS AND EXERCISES ABOUT RELATIONS ACCOMPANYING HANDOUT 12 – 2010 - 2

Do exercise 2, 3, 4 page 1 handout 13.

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

Exercise 12 – 2 – 1: Let $U = \mathbb{R}$. Let A = $\mathbb{N}_2^*$ and B = $\mathbb{N}_3$ Define the relation, R $\subseteq$ A × B, defined by R = {(x,y) | x ≤ y }.

A. Show that R is reflexive (or not).
B. Show that R is symmetric (or not).
C. Show that R is antisymmetric (or not).
D. Show that R is transitive (or not).
E. Explain why some of these questions are insipid, inappropriate, or not applicable.

Exercise 12 – 2 – 2: Let $U = \mathbb{R}$. Let A = $\mathbb{N}_2^*$ Define the relation, R $\subseteq$ A × A, defined by R = {(x,y) | x ≤ y }.

A. Show that R is reflexive (or not).
B. Show that R is symmetric (or not).
C. Show that R is antisymmetric (or not).
D. Show that R is transitive (or not).
E. Find R^{-1} (or not if it does not exist but explain why it D.N.E.).
F. Find $R^{-1} \circ R$ (or not if it does not exist but explain why it D.N.E.).
G. Find $R \circ R^{-1}$ (or not if it does not exist but explain why it D.N.E.).

Exercise 12 – 2 – 3: Let $U = \mathbb{R}$. Let C = $\mathbb{N}_{20}^*$ Define the relation, R $\subseteq$ C × C, defined by R = {(x,y) | x divides y }.

A. Show that R is reflexive (or not).
B. Show that R is symmetric (or not).
C. Show that R is antisymmetric (or not).
D. Show that R is transitive (or not).

Exercise 12 – 2 – 4: Let $U = \mathbb{R}$. Let A = $\mathbb{N}_2^*$, B = $\mathbb{N}_3$, C = $\mathbb{N}_{20}^*$ Define the relation, R $\subseteq$ A × B, defined by R = {(x,y) | x ≤ y } and the relation, S $\subseteq$ B × C, defined by S = {(y,z) | y divides z }

A. Find R ∘ S (or not if it does not exist but explain why it D.N.E.).
B. Find S ∘ R (or not if it does not exist but explain why it D.N.E.).
C. Find R^{-1} (or not if it does not exist but explain why it D.N.E.).
D. Find S^{-1} (or not if it does not exist but explain why it D.N.E.).
E. Find $R^{-1} \circ S^{-1}$ (or not if it does not exist but explain why it D.N.E.).
F. Find $S^{-1} \circ R^{-1}$ (or not if it does not exist but explain why it D.N.E.).
not applicable.