MATH 323 Section 2

QUIZ 4

February 25^{th}*, 2013*

Your Name: ____

Let A be the following set:

$$A = \{a, b, c, d, e, f\}.$$

Suppose R is an equivalence relation on A, and let E_a denote the equivalence class of a, E_b denote the equivalence class of b, etc. For each of the following, explain why the statement is true (using properties of equivalence relations).

a) We must have bRb.
b) If aRd and dRf then the equivalence class of a contains both d and f.
c) If a is in the equivalence class of b then $E_b = E_a$.

a) This is the reflexive property.

b) Since aRd, we have that $d \in E_a$. Using transitivity, since aRd and dRf, we have aRf, so $f \in E_d$.

c) If $a \in E_b$, then aRb and, by transitivity, if cRa, then cRb and so $E_a \subseteq E_b$. Similarly, since aRb, symmetry says that bRa, and by the same transitivity argument, $E_b \subseteq E_a$.