

**Math 331 Spring 2006**  
**Assignment 4: Due by Feb 20**

1. Define a relation which is reflexive, symmetric but non-transitive.
2. Define a relation  $\equiv$  on  $[0, 1]$  as for  $x$  and  $y$  in  $[0, 1]$

$$x \equiv y \text{ if } x - y \text{ is a rational number.}$$

Is this an equivalence relation on  $[0, 1]$  ? Justify your answer. What if we replace *a rational number* by *a irrational number* in the definition of the relation ?

3. Define  $f : \{0, 1, 2, \dots, 10\} \rightarrow \{0, 1, 2, \dots, 10\}$  by

$$f(n) = \text{the remainder after dividing } 4n^2 - 3n^7 \text{ by } 11.$$

- (1) Show that  $f$  is a permutation.
- (2) Compute the parity of  $f$ .
- (3) Compute the inverse of  $f$ .