

Name: \_\_\_\_\_

**(Supp-4)** Let  $\alpha: A \rightarrow B$  be a mapping of sets. Define a relation on  $A$  by  $a_1 \equiv a_2$  if and only if  $\alpha(a_1) = \alpha(a_2)$ . This is in fact an equivalence relation. Thus there is a set of equivalence classes we will denote by  $A_{\equiv}$ .

Define  $\sigma: A_{\equiv} \rightarrow B$  by  $\sigma([a]) = \alpha(a)$ .

1. Show that  $\sigma$  is well-defined. That is, show that if  $[a_1] = [a_2]$ , then  $\sigma([a_1]) = \sigma([a_2])$ .

2. Show that  $\sigma$  is one-to-one.

3. Show that if  $\alpha$  is onto then  $\sigma$  is also onto.