

## HOMEWORK 7

- Prove each of the following is an equivalence relation. Define  $A$  to be the set of all functions from  $\mathbb{R}$  to  $\mathbb{R}$  and define  $B$  to be the set of all differentiable functions from  $\mathbb{R}$  to  $\mathbb{R}$ .
  - 1)  $R_1$  defined on  $\mathbb{Z}$  by  $aR_1b$  if and only if  $3|(a + 2b)$ .
  - 2)  $R_2$  defined on  $A$  by  $(f, g) \in R_2$  if and only if  $f(n) = g(n)$  for all integers  $n$ .
  - 3)  $R_3$  defined on  $B$  by  $(f, g) \in R_3$  if and only if  $f' = g'$  (they have the same first derivative.)