

## Collaborative Homework Week 7

- (1) Let  $f : \mathbb{R} \rightarrow \mathbb{R}$  be the function  $f(x) = \frac{2}{5}x^3 - 6$ .
- (a) Determine whether or not  $f$  is one-to-one. Prove your assertion without graphing the function.
  - (b) Determine whether or not  $f$  is onto. Prove your assertion without graphing the function.
- (2) Consider  $g(x) = \sqrt{x - 4}$ .
- (a) If  $f : \mathbb{R} \rightarrow \mathbb{R}$ , is  $g$  a function? Justify your assertion without graphing.
  - (b) If  $f : [4, \infty) \rightarrow \mathbb{R}$ , is  $g$  one-to-one? Justify your assertion without graphing.
- (3) Consider  $h(x) = 9 - x^2$ .
- (a) Determine sets  $A$  and  $B$  such that  $h : A \rightarrow B$  is a one-to-one function. Justify your assertion without graphing the function.
  - (b) Determine sets  $A$  and  $B$  such that  $h : A \rightarrow B$  is NOT a one-to-one function. Justify your assertion without graphing the function.
  - (c) Determine sets  $A$  and  $B$  such that  $h : A \rightarrow B$  is an onto function. Justify your assertion without graphing the function.
  - (d) Determine sets  $A$  and  $B$  such that  $h : A \rightarrow B$  is NOT an onto function. Justify your assertion without graphing the function.