

## Homework 3 - Math 431

### Due Feb 1st

Instructor	Mauro Maggioni
Office	319 Gross Hall
Office hours	2:45pm on Friday in 304B Gross Hall
Web page	<a href="http://www.math.duke.edu/~mauro/teaching.html">www.math.duke.edu/~mauro/teaching.html</a>

**Reading:** from Reed's textbook: Sections §1.2, §1.3, review the whole Chapter 1.

**Problems:**

§1.2: #6 (try to prove your statements about what the domain and range are), #3. [10 pts each]

§1.3: #3 , #8 (in both exercises, note that the sets need not be disjoint!), #9. [20 pts each]

§1.4: #10 [10 pts], #12 (\*)

**Additional Problems:**

1. All horses are the same color: clearly, any set of one horse is the same color; assuming that in every set of  $n$  horses all are the same color, we conclude that every set of  $n + 1$  horses, labeled from 1 to  $n + 1$ , has the same color, by considering the subsets of horses labeled from 1 to  $n$  and from 2 to  $n + 1$ , each of which must be the same color. Where's the flaw in this argument? (One possibility is that Mathematical Induction, hence WO, is flawed, or can't be applied here for some reason.) [10 pts]