

The instructors will select four of these problems to grade, with each problem worth 5 points. Clear and complete justification is required for full credit. You are welcome to discuss these problems with anyone and everyone, but must write up your own final submission without reference to any sources other than the textbook and instructor. Submissions must be on clean paper with no ragged edges.

1. Let  $f:A \rightarrow B$ ,  $g:B \rightarrow C$ , and  $h:C \rightarrow D$  be functions. Then  $h \circ (g \circ f) = (h \circ g) \circ f$ .
2. Let  $f:A \rightarrow B$  and  $g:B \rightarrow C$  be functions. Then  $g \circ f = f \circ g$ .
3. Let  $i_A$  and  $i_B$  be the identity functions on  $A$  and  $B$  respectively, and let  $f:A \rightarrow B$  be a function. Then  $f \circ i_A = f$  and  $i_B \circ f = f$ .
4. If there is a surjection from  $\mathbb{N}$  to a set  $A$ , then  $A$  is countable.
5. If there is an injection from a set  $B$  to  $\mathbb{N}$ , then  $B$  is countable.
6. If  $A$  and  $B$  are countable sets, then  $A \cup B$  is countable.
7. If  $A$  and  $B$  are denumerable sets, then  $A \cup B$  is denumerable.
8. If  $A$  and  $B$  are countable sets, then  $A \cap B$  is countable.
9. If  $A$  and  $B$  are denumerable sets, then  $A \cap B$  is denumerable.
10. Do the *Inverse Functions* WeBWorK assignment:
  - Your Username should be the same as your Coe network account.
  - Your password should start out as your Coe ID# (of course you should change it promptly).
  - You should have received an email earlier today reminding you of this assignment.
  - A link to WeBWorK can be found on the course web site via <http://www.public.coe.edu/~jwhite/>, or Google for “Jon’s Central”.
  - The WeBWorK assignments will generally be due before midnight on the same day as the Problem Set they’re part of.

