CSE 235   **Homework 06**   **Spring 2012**

Due: Friday, March 2, 2012

Name(Print) _____   **CSE Login** _____

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Problem	Page	Notes	Points	Score
2.2.4	136		4	
2.2.14	136		5	
2.2.18 a,c,d	136		6	
(Bonus) 2.2.24	136	Give a formal proof	3	
(Bonus) 2.2.26	136		3	
2.3.2	152	Yes/No answers	3	
2.3.20	153		4	
2.3.34	154		6	
2.3.40	154		8	
(Bonus)2.3.70	154		5	
(Bonus)2.3.74 a,b,c	154		6	
Problem A	n/a	See Below	9	
Problem B	n/a	See Next Page	20	
Problem C	n/a	See Below	12	
Typesetting (bonus)			8	
Total			77	

Problem A (2.3.10)
Let $f : \{a, b, c, d\} \rightarrow \{a, b, c, d\}$, for each of function f defined below

1. $f(a) = b$, $f(b) = a$, $f(c) = c$, $f(d) = d$.

2. $f(a) = b$, $f(b) = b$, $f(c) = d$, $f(d) = c$.

3. $f(a) = d$, $f(b) = a$, $f(c) = c$, $f(d) = d$.

1. Determine whether f is one-to-one (injective).

2. Determine whether f is onto (surjective).

3. Determine whether f is one-to-one correspondence (bijective).

Problem B (2.3.12)
For *each* function $f : \mathbb{Z} \to \mathbb{Z}$

- $f(n) = n - 1$.

- $f(n) = n^2 + 1$.

- $f(n) = n^3$.

- $f(n) = \lceil \frac{n}{2} \rceil$.

1. Determine whether each f is one-to-one (injective).

2. Determine whether each f is onto (surjective).

3. Determine whether each f is one-to-one correspondence (bijective).

4. Determine whether each f is invertible. If so, give f^{-1}. If not, give the largest domain for which f is invertible and find f^{-1}.

(You should have a total of 16 answers.)

Problem C
For functions $f(x) = x^2 + x$ and $g(x) = x - 2$ from $\mathbb{R}$ to $\mathbb{R}$, find:

1. $f \circ g$

2. $g \circ f$

3. $f \circ f$

4. $g \circ g$

Note: we have rng(f) = rng(g) = domain(f) = domain(g).

Instructions   Follow instructions *carefully*, failure to do so may result in points being deducted.

- The homework can be submitted on paper or via handin. Homework *neatly* formatted in LATEXwill receive a 10 point bonus. You will not receive the 10 bonus points if you work with a partner (see below).

- Clearly label each problem and submit answers *in order*.

- Staple this cover page to the front of your assignment for easier grading.

- Late submissions *will not be accepted*

- When you are asked to prove something, you must give a formal, rigorous, and complete a proof as possible. Each step in your proof must contain explanation that would allow us to understand what theorem/logic you have applied to arrive at that step.

- You are to work individually, and all work should be your own. Check partner policy below.

- The CSE academic dishonesty policy is in effect (see http://cse.unl.edu/ugrad/resources/academic_integrity.php).

Partner Policy You may work in pairs, but you must follow these guidelines:

1. You must work *all* problems *together*. You may not simply partition the work between you.

2. You must use LATEXand you may divide the typing duties however you wish.

3. You may not discuss the problems with other groups or individuals.

4. Hand in only one hard copy with both author's names.