Math 4303 **FUNDAMENTALS OF MATH** Fall 2013
Dr. Duval **Homework**
Thursday, September 19

Follow the separate general guidelines for Parts A,B,C. Be sure to include and label *all four* standard parts (a), (b), (c), (d) of Part A in what you hand in.

Inverse functions

Section 3.1.3 (up through proof of Theorem 3.2)

A: Reading questions. Due by 3pm, Wed., 25 Sep.

1. Give an example of a function h with domain

$$D = \{\text{orange, blue, white, silver, gold, chartreuse}\}$$

that is one-to-one, and a function k with the same domain that is **not** one-to-one. Use the definition of one-to-one function to briefly explain why your answer is correct.

2. What condition is necessary for a function to have an inverse? Does every function have an inverse? Which function in the previous question has an inverse, and which one does not? Show the inverse of the function that has an inverse.

3. How can we use composition to check if g is the inverse of f? Apply this to the function in the first reading question that has an inverse.

B: Warmup exercises. For you to present in class. Due by end of class Thu., 26 Sep.

3.1.3 Problems: 1ab.

Operations as functions

Section 3.1.3 (rest of section, starting on p. 82, Operations as functions)

A: Reading questions. Due by 3pm, Mon., 30 Sep.

1. How can we think of subtraction as a function? Is subtraction closed on the integers? Why or why not?

2. The textbook claims, on p. 83, that multiplication is closed on the set of rational numbers, but not closed on the set of irrational numbers. Justify this claim.

3. Give arguments both for, and against, thinking of differentiation and integration as inverse operations of each other.

4. Give two specific examples of geometric transformations. Now, draw a triangle on your paper; for each of your transformations, show what the transformation does to the triangle. [For best results, do **not** pick a triangle that is equilateral, isosceles, or right.] Also, what is the inverse of each of your transformations?

B: Warmup exercises. For you to present in class. Due by end of class Tue., 1 Oct.

3.1.3 Problems: 6, 8, 9, 13ab