MATH 241: ANALYSIS IN SEVERAL REAL VARIABLES I
WORKSHEET, DAY #1

Problem 1. If $\frac{a}{b} < \frac{c}{d}$ with $b > 0$ and $d > 0$, show that $\frac{a+c}{b+d}$ lies between $\frac{a}{b}$ and $\frac{c}{d}$.

Problem 2. Let

$$S = \{x : x = 5n \text{ for some integer } n\}$$

and let

$$T = \{x : x = 10n \text{ for some integer } n\}.$$

Show in detail that $T \subset S$.

Date: Monday, 30 August 2010.

Problem 3. How many functions are there from the set $\{1, 2, 3, \ldots, n\}$ to the set $\{\square, \diamond, \triangle\}$?

Problem 4. Let $f : \mathbb{R} \to \mathbb{R}$ be defined by $f(x) = x^2$ and let $g : \mathbb{R} \to \mathbb{R}$ be defined by $g(x) = x + 1$.

(a) Give formulas which define the maps $f \circ g$ and $g \circ f$, distinguishing which is which.

(b) Is map f injective (one-to-one), surjective (onto), or bijective (a one-to-one correspondence)? What about g?