

**Handout 4** <sup>$\frac{127}{128}$</sup> 

More Definitions, Claims, Theorems, or Lemmas Which May Be  
of Use for Basic Analytic, Number Theoretic, or Algebraic Proofs

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Let our universe be  $\mathbb{R}$ . So,  $U = \mathbb{R}$

**Definition P.1** (the definition of a 'positive real number'): Let  $x \in \mathbb{R}$ .  
It is the case that  $x$  is positive *iff*  $0 < x$ .

**Definition N.1** (the definition of a 'negative real number'): Let  $k \in \mathbb{R}$ .  
It is the case that  $k$  is negative *iff*  $k < 0$ .

**Definition M.1** (the definition of the 'triple less than'): Let  $x, y, z \in \mathbb{R}$ .  
It is the case that  $x < y < z$  *iff*  $x < y \wedge y < z$ .

**Definition M.2** (the definition of multiplication of rational expressions or real numbers):  
Let  $a, b, c, d \in \mathbb{R}$  such that  $b \neq 0, d \neq 0$ . It is the case that

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$$

**Lemma M.1:** Let  $x \in \mathbb{R}$  such that  $x = -1$ . It is the case that  $x^{-1} = -1$ .