1. **(10점)** Show that a function $f : X \to Y$ is one-to-one if and only if $f \circ g : A \to Y$ is one-to-one for any one-to-one function $g : A \to X$, where A is any set of two elements.

2. **(10점)** Suppose that we are given a code table:

$$\{Code(a) = 1, Code(b) = 2, \cdots, Code(z) = 26, Code(\text{blank}) = 0\}.$$

We want to store the part "to be or not" from a sentence in Hamlet as a number x_b in the interval $(0, 1)$ using the numeral system with base b, such that

$$A_b[k] = \left\lfloor x_b \times b^{10k} \right\rfloor \mod b^{10},$$

where $A_b[k]$ is base-b representstion of code of the k-th letter in the sentence.

(eg $A_{10}[1] = Code(t) = 20$, $A_{10}[2] = Code(o) = 15$, $A_{10}[3] = Code(\text{blank}) = 0$, and so on.) Write the number x_b when $b = 2$ (binary case).

3. **(하나 : 7점, 둘다 : 10점)** Rewrite the left hand side of the following expression in (a)postfix or (b)prefix forms only using operations from $\times$, $\div$, $+$, $-$ (Don't use exponentiation and parentheses in your final forms.):

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

(Note that x^2 means $x \times x$.)

수고하셨습니다!