

Problem Solving

Set 10

13 July 2012

1. Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be a continuous function. Suppose that for any $c > 0$, the graph of f can be moved to the graph of cf using only a translation or a rotation. Does this imply that $f(x) = ax + b$ for some real numbers a and b ?
2. Find a 10-digit number using each of the numbers from 0 to 9 once such that the last i digits are perfectly divisible by i .

(For example the 3-digit number 120 has this property:

$1 \mid 0$, $2 \mid 20$, $3 \mid 120$.)