Let $f : \mathbb{R} \to \mathbb{R}$ 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 $b$?

**Solution:**

No. If $f(x) = e^x$, then $cf(x) = c\,e^x = e^{x+\ln c} = f(x + \ln c)$, which is a translation of magnitude $\ln c$ over the X axis.