ADDITIONAL PROBLEMS

1. Assume that $f \in C^4(R)$, and $f'(0) \neq 0$. Show that there is a unique Möbius transform
   
   $\phi(x) = \frac{ax+b}{cx+d}$, such that

   $$\lim_{x \to 0} \frac{\phi \circ f(x) - x}{x^3}$$

   is finite. When the limit is finite, show that it equals to $\frac{Sf(0)}{6}$.

2. Assume that $Sf(x) < 0$ for all $x \in R$, $p$ is a one-sided attracting periodic point of $f$, and $W(p)$
   is the maximal stable interval containing $p$. Assume that $W(p)$ is bounded. Show that for some $i$,
   there is a critical point of $f$ in $W(f^i(p))$. 