Problem of the Week-7

Posting Date 12/2/03. Submit solutions to Noah Aydin, RBH 309-A (e-mail or hard-copy) by 4 pm on 12/12/07.

Let $f$ be a positive (that is $f(x) > 0$ for all $x$), continuously differentiable (i.e. $f'$ is continuous) function defined for all real numbers, whose derivative is always negative. For any real number $x_0$, let the sequence $x_n$ be obtained by the Newton’s method, i.e., $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$. Show that the limit of $x_n$ is always $\infty$. 