Math 370 Assignment Question (1a)

Professor:	*Richard Hall*
Instructions:	*Please explain your solutions carefully.*
Due Date:	*22 September 2016.*

(i) Suppose $f(x)$ is (i) continuously differentiable for all $x \in \Re$, and (ii) the function f satisfies Cauchy's functional equation $f(x+y) = f(x) + f(y)$. Prove that $f(x) = f(1)x$.

(ii) Now solve Cauchy's equation under the weaker assumption that $f(x)$ is continuous. HINT: first solve for fractions, then recall that $x_n \to x \Rightarrow f(x_n) \to f(x)$.