Practice Final Exam

Problem 1. i) Given $f : I \to \mathbb{R}$ where $I$ is an open interval and $x_0 \in I$, write down the definition of $f'(x_0)$.

ii) Prove that if $f$ is differentiable at $x_0$, then $f$ is continuous at $x_0$.

iii) Give an example of a function $f : I \to \mathbb{R}$, where $I$ is an open interval, that IS continuous but it IS NOT differentiable at some $x_0 \in I$. Justify your answer! Here you can choose your own interval $I$ and function $f$.

Problem 2. Prove that the following equation has exactly two solutions:

$$x^6 + 7x + 2 = 0.$$