Math 325. Group Quiz #10a

(1) State the *Intermediate Value Theorem*.

(2) TRUE OR FALSE, and *justify*:
The function

$$f(x) = \begin{cases} x^2 + x & \text{if } x \geq 0 \\ x & \text{if } x < 0 \end{cases}$$

is differentiable at $x = 0$.

(3) TRUE OR FALSE, and *justify* with a short proof or example:
There is a continuous function $f : [1, 3] \to \mathbb{R}$ with range $[0, \frac{1}{2}] \cup [\frac{3}{2}, 2]$.