Let $f : \mathbb{R} \to \mathbb{R}$ be a real function. Prove or disprove each of the following statements.

(a) If f is continuous and range$(f) = \mathbb{R}$ then f is monotonic.

(b) If f is monotonic and range$(f) = \mathbb{R}$ then f is continuous.

(c) If f is monotonic and f is continuous then range$(f) = \mathbb{R}$.