Name: _____ Score (Out of 8 points):

1. Let (X, d_X) and (Y, d_Y) be metric spaces. Let $f : X \to Y$ be a function. Fix $x_0 \in X$.

   (a) (4 points) Suppose that f has the property that, for every neighbourhood U of $f(x_0)$, the preimage $f^{-1}(U)$ is open in X. Prove that f is continuous at the point x_0.

   (b) (4 points) Suppose that f is continuous at the point x_0. Show that, if $(a_n)_{n\in\mathbb{N}}$ is a sequence of points in X converging to x_0, then $(f(a_n))_{n\in\mathbb{N}}$ converges to $f(x_0)$.