Extra Credit Assignment 7

Due Friday, April 2, 11:59 PM

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(a) Let $f : X \to Y$ be a continuous function. For a given $x_0 \in X$, let $y_0 = f(x_0)$. Show that the function

$$f_\sharp : \pi_1(X, x_0) \to \pi_1(Y, f(x_0)), \qquad [\gamma] \mapsto [f \circ \gamma]$$

is a group homomorphism.

(b) If you are further given a continuous function $g : Y \to Z$, let $z_0 = g(y_0)$. Show that $(g \circ f)_\sharp = g_\sharp \circ f_\sharp$.

(c) Show that if f is a homotopy equivalence, then $f_\sharp$ is a group isomorphism.