Homework 1
Due Wednesday, Jan. 22nd
Answers should be written in LATEX.

1. Let
$$f, g \colon (S^1, \{[0]\}) \to (S^1, \{[0]\})$$
be continuous maps. Show that $f \simeq g$ if and only $f \simeq_p g$. That is show that f and g are homotopic if and only if they are homotopic as pairs.

2. In class we defined maps
$$f_n \colon ([0, 1], \{0, 1\}) \to (S^1, \{[0]\}).$$
Show that there exists a unique map
$$g_n \colon S^1 \to S^1$$
such that $f_n = g_n \circ f_1$. Then show that an arbitrary map
$$g \colon S^1 \to S^1$$
is homotopic to a unique g_n.

3. Problems 2a and 3a-d in section 51, p. 330 of Munkres.