A. Section 51 Exercise 1 (practice with basic concepts in homotopy).

B. Section 51 Exercise 3ab. (Parts c and d are valuable too, but I am not asking you to hand them in.)

On page 327, Munkres implicitly states this lemma:

Lemma: Suppose that $f_0, f_1 : I \to X_T$ are path-homotopic via a path homotopy F. Suppose that $k : X_T \to Y_S$ is any map. Then $k \circ f_0$ and $k \circ f_1$ are paths in Y_S, and $k \circ F$ is a path homotopy between them. Moreover, if $f, g : I \to X_T$ are paths such that $f(1) = g(0)$, then $k \circ (f * g) = (k \circ f) * (k \circ g)$.

C. Prove the lemma above. (Insofar as this exercise is difficult, the difficulty lies in figuring out what it is asking.)