MA 294 - Turn in #2

(1) For groups G_1 and G_2 a function $f : G_1 \to G_2$ is a homomorphism if

$$f(g *_1 h) = f(g) *_2 f(h)$$

for every $g, h \in G_1$.

Let $K = \{g \in G_1 \mid f(g) = e_2\}$ where e_2 is the identity of G_2.

(a) Show that K is a subgroup of G_1.

(b) Show that if f is one-to-one then $K = \{e_1\}$ and conversely that if $K = \{e_1\}$ then f must be one-to-one.

[10 points]

(2) For $n > 1$ let $G = \{\sigma \in S_n \mid \sigma(1) = 1\}$.

(a) Show that G is a subgroup of S_n.

(b) Determine $|G|$?

[10 points]

[This question is not for points so if you're not sure, don't worry.]

What group do you think G isomorphic to?