General Mathematics and CPS II

Exercise 8

February 28, 2014

1. Let G be a group and let $a, b \in G$. Show that $(ab)^{-1} = b^{-1}\, a^{-1}$.

2. (Ivanov, p. 39.) Recall that the symmetry group of a subset A of the plane is defined as
$$\mathrm{Sym}(A) = \{F \text{ motion} \colon F(A) = A\}\,.$$
Prove that such a set of motions is indeed a group.

3. Let G be a finite group (i.e., a group with a finite number of elements), and let $a \in G$. Show that there exists some $n \in \mathbb{N}$ such that $a^n = e$.

   Recall: a^n is understood as letting the group operation act between n copies of a.