PRINT Your Name:__________________________________

Quiz for April 1, 2010

The quiz is worth 5 points. **Remove EVERYTHING from your desk except this quiz and a pen or pencil.**

Let $\varphi\colon G_1 \to G_2$ and $\theta\colon G_2 \to G_3$ be group homomorphisms. Prove that the composition $\theta \circ \varphi$, from G_1 to G_3, is a group homomorphism.

ANSWER:

Let g and g' be elements of G_1. We compute

$$(\theta \circ \varphi)(gg') = \theta(\varphi(gg')) = \theta(\varphi(g)\varphi(g')) = \theta(\varphi(g))\theta(\varphi(g')) = (\theta \circ \varphi)(g)(\theta \circ \varphi)(g).$$

The first equality is due to the definition of composition. The second equality is due to the hypothesis that φ is a homomorphism. The third equality is due to the hypothesis that θ is a homomorphism. The final equality is the definition of composition.