

### Homework #3 - Elementary Modern Algebra I (Fall 07)

09/10/07

*Please, write down your solutions neatly and explain your reasoning clearly.*

1. (4 points) Find  $x, y \in \mathbb{Z}_{17}$  such that

$$5 +_{17} x = 3 \quad \text{and} \quad 5 \cdot_{17} y = 2.$$

2. (4 points) Let  $\varphi : M \rightarrow M$  be a map such that  $\varphi \circ \varphi = \text{id}_M$ .

(a) Give an example of such a map  $\varphi$  where  $\varphi \neq \text{id}_M$ .

(b) Argue that  $\varphi$  is bijective and find its inverse map.

3. (4 points) Let  $G$  be a group with two elements. Determine its group table. Mark the identity of  $G$ .

**Due date:** September 17, 2007