Group theory – Hand in sheet 3

deadline: 12/Oct/10

Fact: If G and H are groups, the product $G \times H$ can be given a group structure by

$$(g_1, h_1) \cdot (g_2, h_2) = (g_1 \cdot g_2, h_1 \cdot h_2), \qquad \forall g_1, g_2 \in G \text{ and } h_1, h_2 \in H.$$

This is the group structure of the *product* of two groups.

1) Which of the following groups are isomorphic?

- $\mathbb{Z}_2 \times \mathbb{Z}_2$ and $\mathbb{Z}_4$;
- $\mathbb{Z}_2 \times \mathbb{Z}_3$ and $\mathbb{Z}_6$;
- $(\mathbb{R}^*, \cdot)$ and $(\mathbb{R}, +)$;
- $(\mathbb{R}, +)$ and $(\mathbb{R}_+, \cdot)$, the positive real numbers with multiplication of real numbers as group operation.