Revision Problem

[Type up Homework #7 Problem #4(a) and its solution in LaTeX.]

Name: **My Name Goes Here**

Let G and H be groups. Show $\{e\} \times H = \{(e, h) \mid h \in H\}$ is a normal subgroup of $G \times H$
(where e is the identity of G).
Note: You need to show that $\{e\} \times H$ is a subgroup and that it is normal in $G \times H$.

Proof: We will use the normal subgroup test.

- Obviously $\{e\} \times H$ is non-empty since H (being a group) is non-empty. In particular, if e' denotes the identity of H, then $(e, e') \in \{e\} \times H$.

- Suppose STUFF

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Therefore, by the subgroup test, $\{e\} \times H$ is a subgroup of $G \times H$. In addition, we have:

- Suppose STUFF

Therefore, by the normal subgroup test, $\{e\} \times H$ is a normal subgroup of $G \times H$. $\square$