Math 3110 **Due: Wed., Apr. 3rd, 2024**

Homework #8
Revision Problem

Name: My Name Goes Here

Revision Problem (Homework #7 Problem #5(a)):

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's normal in $G \times H$.

Proof: We use the normal subgroup test.

Non-empty Subset: Since $e \in H$, we have $(e, e) \in \{e\} \times H$ and thus we have a non-empty subset of $G \times H$.

Closure: Suppose $(e, a), (e, b) \in \{e\} \times H$ so that $a, b \in H$ ...

Closure under Inverses: ...

Closure under Conjugation: ...

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