# Naive Lie Theory 3.2 Exercises

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September 2025

## Notes

Nothing much to say here.

## 3.2.1

Say we have a path $P(x)$, where $x \in [0,1]$. $P(0) = 1$ and $P(1) = B$, and $P$ is continuous. We simply define $Q(x) = AP(x)$. As matrix multiplication is continuous, $Q$ is continuous. $Q(0) = A$ and $Q(1) = AB$, so we have a continuous path from $A$ to $AB$ thus from 1 to $AB$, as we have one from 1 to $A$.

## 3.2.2

Similarly, we have $P(x)$ where $P(0) = 1$ and $P(1) = A$. We define $Q(x) = (P(x))^{-1}$, which is a continuous path from 1 to $A^{-1}$.

## 3.2.3

3.2.1 and 3.2.2 showed that the set of identity components are closed under group operation and inverse, thus it's a subgroup. Note that simply being closed under group operation is not sufficient, as that only works for finite groups.