1. Let $D_3 = \{R_0, R_{120}, R_{240}, V, D', D''\}$ be the set of all symmetries of an equilateral triangle. Complete the following Cayley table.

$*$	R_0	R_{120}	R_{240}	V	D'	D''
R_0						
R_{120}				D'		
R_{240}				D''		
V					R_{240}	
D'						
D''						

2. Let $A = \mathbb{R}\backslash\{-1\}$ and let $*$ be an operation on A defined by $a * b = a + b + ab$.

(a) Check $(1 + a)(1 + b) = 1 + a * b$ for all $a, b \in A$. Hence show that $*$ is an associative binary operation on A.

(b) Show $(A, *)$ is a group.

(c) Let $B = \mathbb{Q}\backslash\{-1\}$. Show that $(B, *) \leq (A, *)$.

3. Let G be a group, H a subgroup of G. If L is a subgroup of H, then show that L is a subgroup of G.

4. Show that $(\mathbb{Z}, +) \not\cong (\mathbb{R}, +)$.