

# Maths 720 Notes

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## 1 Groups

- 1.1 Definition and Examples
- 1.2 Important Subgroups, Cosets and Normality
- 1.3 Homomorphisms
- 1.4 Factor Groups

## 2 Group Actions

- 2.1 Definitions
- 2.2 Orbit Stabiliser Theorem
- 2.3 Fundamental Counting Principle
- 2.4 Characters and Cauchy - Frobenius

## 3 Sylow Theorems

## 4 Finite Abelian Groups

## 5 Free Groups

## 6 Group Presentations

## 7 Subgroup Series and Structure of Finite Groups

### 7.1 Soluble Groups

### 7.2 Nilpotent Groups

### 7.3 Simplicity of $A_n$

### 7.4 Classification of Finite Simple Groups

## 8 Groups Contrustions

### 8.1 Semi-Direct Products

### 8.2 Wreath Products