

Abstract Algebra

“I realized that to me, Gödel, Escher, and Bach were only shadows cast in different directions by some central solid essence. I tried to reconstruct that central object, and came up with this book.” - Douglas Hofstadter

I realized that to me, **Number Theory, Geometry, and the Theory of Algebraic Solutions** were only shadows cast in different directions by some central solid essence. I tried to reconstruct that central object and came up with **Abstract Algebra**.

I realized that to me, **the symmetries of the equilateral triangle, the hexaflexagon, and the propeller** were only shadows cast in different directions by some central solid essence. I tried to reconstruct that central object and came up with **the concept of a group**.

I realized that to me, **the symmetries of the propeller, the equivalence classes mod 4, and the color wheel group** were only shadows cast in different directions by some central solid essence. I tried to reconstruct that central object and came up with **the concept of group isomorphism**.

I realized that to me, **all cyclic groups of order n** were only shadows cast in different directions by some central solid essence. I tried to reconstruct that central object and **realized that all cyclic subgroups of order n are isomorphic to Z_n** .

I realized that to me, **all groups** were only shadows cast in different directions by some central solid essence. I tried to reconstruct that central object and **realized that every group is isomorphic to a group of permutations**.

I realized that to me, **the finite Abelian groups** were only shadows cast in different directions by some central solid essence. I tried to reconstruct that central object and came up with the **direct products of cyclic groups of prime-power order**.

I realized that to me, **the normal subgroups of a group G** were only shadows cast in different directions by some central solid essence. I tried to reconstruct that central object and came up with **kernels of group homomorphisms**.

I realized that to me, **the finite Abelian groups** were only shadows cast in different directions by some central solid essence. I tried to reconstruct that central object and came up with **direct products of cyclic groups of prime-power order**.

I realized that to me, **the integers, the integers mod n , n -by- n matrices with integer entries, continuous real-valued functions passing through the point $(1,0)$, etc.** were only shadows cast in different directions by some central solid essence. I tried to reconstruct that central object and came up with **the concept of a ring**.

I realized that to me, **the integers mod p , the reals, the rationals, the complex numbers, etc.** were only shadows cast in different directions by some central solid essence. I tried to reconstruct that central object and came up with **the concept of an field**.