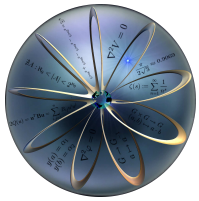

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fundamental theorem of finitely generated abelian groups

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Theorem 1 (Fundamental Theorem of Finitely Generated Abelian Groups)**.** *Let G be a finitely generated abelian group. Then there is a unique expression of the form:*

$$G \cong \mathbb{Z}^r \oplus \mathbb{Z}/n_1\mathbb{Z} \oplus \mathbb{Z}/n_2\mathbb{Z} \oplus \ldots \oplus \mathbb{Z}/n_s\mathbb{Z}$$

for some integers r, n_i satisfying:

$$r \geq 0; \quad \forall i, n_i \geq 2; \quad n_{i+1} \mid n_i \text{ for } 1 \leq i \leq s-1.$$