



Davao del Sur State College
Brgy. Matti, Digos City, Davao del Sur

THEORY OF NUMBERS: Localized Edition



Preface

This coursepack grew out of a simple classroom observation repeated across many semesters at the Institute of Mathematics, Arts, and Sciences: pre-service and in-service mathematics teachers can execute the mechanics of Theory of Numbers competently, yet many struggle to see why a topic like congruences or the Euclidean Algorithm should matter to anyone standing in front of a Grade 8 or Grade 11 classroom in Davao del Sur. The Week 1 lecture module on which this material is based already covers the standard canon of an undergraduate and graduate number theory course — sets and functions, mathematical induction, the binomial theorem, divisibility theory, congruences, the theorems of Fermat, Euler, and Wilson, and number-theoretic functions. What this coursepack adds is a consistent pedagogical scaffold and a deliberate return, unit after unit, to the province the majority of our students call home.

The scaffold is the 4A's Instructional Model — Activity, Analysis, Abstraction, Application — long used in Philippine teacher education because it refuses to let formalism arrive before intuition has had a chance to form. Each unit therefore opens with a short, concrete task that lets a pattern surface informally, follows it with guide questions that press that intuition into words, only then presents the formal definitions and theorems, and closes with problems that consolidate what was learned and ask the learner to imagine teaching it forward. A fifth movement, the Localized Application, was added specifically for this edition: five fully worked problems per unit set in the Bankerohan and Digos City public markets, the durian and banana plantations of Malalag, the Kadayawan sa Dabaw festival, cooperative finance, and the jeepney routes many of our students ride to campus every day.

The localization is not decoration. A theorem that a future teacher has only ever seen applied to abstract integers is a theorem they will teach as abstract integers. A theorem they have used to size a durian delivery sack, assign a Kadayawan parade lane, or verify a cooperative's fair-share protocol is a theorem they can hand to their own students as something that structures decisions their community already makes. That transfer — from the page to the plaza, and eventually from this classroom to theirs — is the purpose this coursepack was built to serve.

This edition adds three things to the source module: a preface and reference list appropriate to a stand-alone coursepack rather than a lecture transcript; a short introductory statement opening every unit, orienting the reader to where the unit sits within the larger architecture of number theory; and a short introductory statement opening every section within each unit — Learning

Outcomes, Activity, Analysis, Abstraction, Application, and Localized Application — so that a reader always knows why the section that follows exists before working through it. The mathematics itself — every definition, theorem, proof idea, worked example, and solved problem — is carried over from the source module unchanged in substance.

This coursepack is intended primarily for the graduate and pre-service Theory of Numbers module offered under the Bachelor of Science in Mathematics program at Davao del Sur State College, and secondarily as a model — imperfect and improvable — of what a contextualized mathematics coursepack for this province can look like. Colleagues who teach the same module, and students who work through it, are warmly invited to treat the Localized Application sections as a template rather than a ceiling: the same five movements can and should be re-imagined around whichever barangay, industry, or festival is closest to a given classroom.

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