

Introduction

It is well known that students will pose questions to teachers about a variety of topics. Oftentimes, these topics are related to what is being taught. Yet on occasion, students who hear about things mathematical from family, friends, or the media will not hesitate to ask their math teacher to explain something that may have been confusing to them. Most of the time, teachers can respond to these questions in proper fashion. However, there may be times when the question asked is not at ready reference for the teacher. We hope that this book will provide a resource for teachers who need a quick response to a variety of questions relating to school mathematics.

In general, mathematics education practitioners and researchers agree that teachers need to present mathematics as a motivating subject to their students—one that promotes and fosters thinking, and, at times, flexible and unrestricted inquiry. In fact, when explaining the Process Standard “Reasoning and Proof,” the National Council of Teachers of Mathematics states thus: “The ability to reason systematically and carefully [in mathematics] develops when students are encouraged to make conjectures, are given time to search for evidence to prove or disprove them, and are expected to explain and justify their ideas.” Clearly, this statement indicates a national imperative in mathematics education for teachers to emphasize the importance of process as well as mathematical thinking in their classes.

At the same time, students want—and need—to know the answers to their mathematics questions without the teacher telling them to think through the problem. In other words, although process in solving mathematical problems and conceptual understanding of mathematical topics are both important, students need to learn procedural methods that will help them solve problems efficiently and effectively.

In this book, the authors identify common mathematics content questions that students, almost exclusively at the secondary level, often ask in class. We then follow each question with clear and concise answers that are aligned with the Common Core State Standards. Although the question-answer dyads themselves will span the middle school and high school grade levels, some questions might be introduced in grade levels prior to

middle school. Accordingly, secondary-level students frequently ask questions that appear to be late elementary in terms of content. Because of their seemingly elementary-level nature, teachers often dismiss such questions. Given the emphasis on secondary-school student mathematics questions, our focus is to tailor seemingly elementary-level questions toward secondary mathematics courses.

This book will help to prepare the novice mathematics teacher or serve as enrichment for the more experienced mathematics teacher in anticipating common content-related mathematics questions that students of all ages and grade levels will undoubtedly ask during the school year. In addition, the authors strive to provide efficient answers that encourage flexibility in ways of solving various mathematics problems. The topic of this book is of increasing importance so that teachers of mathematics answer students' questions effectively and anticipate what students will ask so that the presentation of answers is clear and concise. Of equal importance is the book's emphasis on answers to mathematical questions as they relate to efficient test-taking strategies in different assessments that students will need to take, especially at the secondary level.

Each chapter provides a detailed list of common mathematics questions along with their answers in the most comprehensive way possible. This book focuses on practical application in mathematics and highlights ways that teachers can engage and motivate students. At the same time, the practical nature of the book is supported by research in mathematics education and human development.