

## Document Details

### How to Use the Document

The pages of the document are organized according to the specific learning outcomes in the Grade 10 Introduction to Applied and Pre-Calculus (IAP) Mathematics curriculum framework. For example, page R-9 refers to outcome 10I.R.9, which is “Solve problems that involve systems of linear equations in two variables, graphically and algebraically.” Rather than providing questions that address the outcome specified on the page, the questions are **focused on prior learning** that students should solidify and revisit before or during the process of learning the content of the Grade 10 IAP outcome. Teachers have access to text resources as sources of questions related directly to the outcome; the questions in this document are a source of questions that connect prior learning to the Grade 10 IAP outcomes.

The pages of this document are not intended to be used in a prescribed order. The pages can be used in any order to match the sequence of instruction of the Grade 10 IAP topics determined by the teacher. The pages are ready to be used as they are, but it is not intended that students be assigned and complete all questions on a page. Rather, the specific questions and the number of questions that teachers assign will differ depending on the varying needs of their students.

Since the questions solidify prior learning and are not questions directly related to an outcome, a teacher may decide to use questions from a page that refer to an outcome different from the one students are currently working on. For example, students may be learning content for outcome 10I.R.9 but a teacher may choose to have students do questions from page R-4. Since the questions involve prior learning, the content that students require to solve the problems will be accessible. Teachers need to make thoughtful choices about the specific questions that are used and the timing of their use to best meet the needs of their students.

Teachers also need to make a decision about the frequency of use of these questions. A teacher may choose to use one page per week in a semester course or more intermittently, depending on the needs of the students. It is not necessary for every student to do the same questions on each page. Additionally, teachers need to consider whether a question will be solved individually or collaboratively in small groups or as a whole class. Many of the questions ask students to explain or justify their thinking, so teachers may need to facilitate the discussion between students. Teachers will need to gauge the amount of time allotted to this work to strike an appropriate balance so that reinforcing and connecting prior learning does not overshadow the development of understanding of outcomes of the Grade 10 IAP curriculum.

Solutions are provided for each question. A “Teacher Note” icon **(TN)** identifies questions with some further information listed, along with the solution. The notes may give optional instructions to accompany a question, an indication of discussion topics for follow-up to a question, or suggestions as to how the question could be adjusted to make it accessible at different levels.

Finally, the questions in the document may serve as models for teachers to look for or create other questions. One type of question used regularly is the open question. When creating an open question, it is usually best to provide thoughtful constraints on the openness to encourage students to reason and analyze within those constraints. There are several different types of questions illustrated in the document and they are described in the next section.

## Types of Questions

The pages are organized with questions for developing number sense at the top of each page. These questions are designed to help students continue to build the number sense making that they began in Early Years and continued in Middle Years mathematics. The other questions on the page relate to the prior learning required to achieve the outcome as given at the top of the page (and referred to by the page number). There is a variety of types of questions in the document:

- Questions to practise a strategy or a skill previously learned by students
- Open questions designed to promote student thinking and dialogue, such as
  - open-ended questions with multiple solutions
  - open-middle questions with single answers but multiple paths or strategies to get to the answers
- Questions to support conceptual understanding of concepts previously learned by students
- Questions to develop students’ problem-solving skills (whether a question is a novel problem will depend on the experience of each student)

Foundational experiences make up a separate section of this document. The content of this section is based on the work of Dr. Ralph Mason and has been adapted for use here. The foundational experiences show possibilities for teachers to provide experiences for students that lay the foundation for deeper learning of concepts. The implementation of the foundational experiences will require an extended period of time, ranging from one to multiple class periods. Teacher planning will involve creating an appropriate sequence of questions and anticipating the responses (and questions) that students will have to guide the development of their understanding.