

MATHEMATICAL SUMMARIES

Purpose

Summarizing, as Rick Wormeli (2005) tells us, is one of the most powerful teaching and learning strategies available to teachers. Yet, in the classroom, the power of summarizing is often overlooked. Nowhere is this truer than in mathematics classrooms, where teaching students how to focus their attention on the biggest and most important ideas is often sacrificed in the name of content coverage. But how will students be able to comprehend or remember what we teach them if they don't know how to prioritize information or how to separate the crucial from the marginal? How will students build new learning on top of old learning if they can't call up and restate that learning in the first place?

Mathematical Summaries is a powerful way for students to transform a wealth of information into that clear and concise package called a summary.

Overview

Mathematical Summaries begins with a source of information—anything from a reading to a visual prompt to the students' notebooks. Whatever source of information is chosen, the goals of Mathematical Summaries remain the same: encouraging students to take a closer look at the mathematics they are studying, giving them the opportunity to explain content in their own words, and helping them take ownership of the concepts they are learning.

Mathematical Summaries can take several forms. You can ask students to

- Read or listen to a passage and summarize in their own words the mathematics concepts being discussed.
- Review their notes (including homework, quizzes, and classroom examples) and pick out the critical concepts and key terms.
- Look over a table, chart, or graph (even maps, artwork, or architecture) and explain the mathematics at work.

Building Common Core Thinking

Mathematical Summaries develops students' abilities to analyze structures, make sense of concepts, and communicate what is being learned in general terms—all critical abilities in developing sound arguments. Mathematical Summaries supports the following Standards for Mathematical Practice (MP):

- ☞ *(MP 1) Sense:* analyzing and explaining aspects of a concept to oneself
- ☞ *(MP 3) Argument:* supporting arguments with logical progression of statements
- ☞ *(MP 6) Precision:* creating carefully formulated explanations
- ☞ *(MP 7) Structure:* looking closely to discern patterns or structures
- ☞ *(MP 8) Repetition:* generalizing

Steps

1. Direct students to their textbooks or notebooks, or select a relevant passage to discuss.
2. Read the selection with students or have students read the selection independently.
3. Have students review and summarize the selected material and then retell what they have read, listened to, or observed using their own words.

Examples

Lemonade Stand

Think about the word problem we solved yesterday about Malcolm's lemonade stand. Write a paragraph that explains Malcolm's problem with the lemons and how we solved it. Include how we figured out which information was important and how we used mathematics to solve Malcolm's problem.

Pythagorean Theorem

Before we continue to learn more about the applications of the Pythagorean Theorem, take some time to think about what you already know. Each of you has a piece of cardstock cut into a right triangle. On one side of the triangle, write down everything you know or think you know about the Pythagorean Theorem. On the reverse side of the triangle, write down at least one question that you have about the Pythagorean Theorem or about Pythagoras himself.

Calculus Integration

Work with a partner and review your notes on the washer method and cylindrical shells method of calculus integration. One student in each pair will review the washer method, and the other student will review the cylindrical shells method. Use your notebooks, homework, and written examples to help you review. After you have reviewed your method, present a clear summary for your partner that addresses all of the major points. The person listening to the summary will check for accuracy. Each person in the pair will have a turn at summarizing a method and listening to a summary.