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AN IN-DEPTH LOOK AT MATHEMATICS 2 AT PHILLIPS EXETER ACADEMY

When it comes to rigorous, forward-thinking mathematics education, few names resonate as strongly as Phillips Exeter Academy. Nestled in Exeter, New Hampshire, this prestigious boarding school has developed a mathematics curriculum that challenges the very notion of how math is taught. At the heart of this curriculum lies a sequence of courses that redefines student engagement. Among them, **Mathematics 2 Phillips Exeter Academy** stands out as a pivotal course that bridges foundational skills and advanced problem-solving. But what exactly makes this course so distinctive, and why do students, educators, and even parents speak of it with such reverence? In this article, we will explore the structure, philosophy, content, and lasting impact of Mathematics 2 at Exeter, providing a comprehensive guide for anyone curious about this transformative academic experience.

WHAT IS MATHEMATICS 2 AT PHILLIPS EXETER ACADEMY?

Mathematics 2 is the second course in Exeter's renowned math sequence, which typically includes Mathematics 1, 2, 3, 4, and 5. The sequence is designed not as a set of isolated classes but as a continuous, spiraling journey through mathematical concepts. While Mathematics 1 establishes a strong foundation in algebra, geometry, and basic functions, **Mathematics 2 Phillips Exeter Academy** pushes students deeper into abstraction, logic, and multi-step reasoning. It is often taken by ninth- or tenth-grade students, though advanced younger students or older students new to the Exeter method may also enroll.

The course is built around the iconic **Exeter Math textbooks**—a series of problem sets that contain no traditional instruction, no chapter summaries, and no worked examples. Instead, each problem is a carefully crafted puzzle designed to be solved collaboratively. In Mathematics 2, students encounter problems that blend algebra, geometry, trigonometry, probability, and number theory into seamless challenges. The goal is not to learn a formula by rote but to develop the ability to think flexibly and persist through difficulty.

THE EXETER MATH APPROACH: PROBLEM-BASED LEARNING

To truly understand Mathematics 2 at Phillips Exeter Academy, one must first appreciate the pedagogical philosophy behind it. Exeter's math department has long rejected the conventional lecture-and-homework model. Instead, they employ a **problem-based learning** approach in which every class session revolves around student-driven discussion of a set of problems assigned the previous day.

In a typical Mathematics 2 class, students arrive having worked through a list of five to eight problems. There is no textbook reading; the problems themselves are the curriculum. Class begins with students sharing their approaches, questioning each other's reasoning, and collectively discovering solutions. The teacher acts as a facilitator, rarely providing direct answers but instead asking probing questions like, "What happens if you try a different variable?" or "Can you connect that to the previous problem?"

The Harkness Method in Mathematics 2

Integral to this process is the **Harkness method**, a discussion-based teaching style named after the round tables (Harkness tables) used at Exeter. In Mathematics 2, students sit around an oval table, facing one another. This physical arrangement fosters an environment of equality and collaboration. Every student is expected to contribute—whether by presenting a solution, asking a clarifying question, or challenging a peer's logic.

The Harkness method does more than teach mathematics; it teaches communication, active listening, and intellectual courage. For many students, the transition from a traditional classroom to a Harkness-based Mathematics 2 is challenging but ultimately liberating. They learn that making mistakes is part of the process, and that deep understanding often comes from wrestling with a problem over multiple attempts.

TOPICS COVERED IN MATHEMATICS 2 AT PHILLIPS EXETER ACADEMY

While the specific problems in the Exeter Mathematics 2 textbook evolve slightly from year to year, the core topics remain consistent. The course is not organized into neat units like "Chapter 3: Quadratic Equations." Instead, topics interweave, reappearing across problem sets to reinforce connections. Below are the major mathematical domains covered:

- **Advanced Algebra:** Students deepen their manipulation of polynomials, rational expressions, and radical equations. The emphasis is on solving complex equations that require multiple steps and clever substitutions.
- **Geometry and Proof:** Euclidean geometry is a major component, with problems focusing on congruence, similarity, circle theorems, and coordinate geometry. Students are expected to write logical proofs, often in paragraph form rather than the two-column style.
- **Trigonometry Foundations:** Right triangle trigonometry, the unit circle, and basic trigonometric identities are introduced. These concepts are immediately applied to geometry problems, reinforcing their utility.
- **Functions and Graphing:** Linear, quadratic, exponential, and piecewise functions are studied. Exeter problems often require sketching graphs from verbal descriptions or interpreting graphs to answer contextual questions.
- **Probability and Counting:** Combinatorics, basic probability rules, and expected value are explored through puzzles and real-world scenarios. These topics build logical reasoning skills essential for later statistics courses.
- **Number Theory:** Divisibility, modular arithmetic, and integer properties appear frequently. Such problems train students to think about structure rather than calculation.
- **Patterns and Sequences:** Arithmetic and geometric sequences, recursive definitions, and summation notation are introduced, often in the context of problem-solving

rather than explicit instruction.

One hallmark of **Mathematics 2 Phillips Exeter Academy** is the way these topics are blended. A single problem might require a student to use algebraic manipulation, geometric insight, and probabilistic reasoning all at once. This integrated approach mirrors the way mathematics is used in advanced fields and prepares students for the interdisciplinary nature of research.

HOW MATHEMATICS 2 DIFFERS FROM TRADITIONAL HIGH SCHOOL MATH

For students and parents accustomed to the typical high school math progression (Algebra 1, Geometry, Algebra 2, Precalculus), the Exeter Mathematics 2 experience can feel jarring at first. The differences are profound:

- **No Lectures:** In a traditional classroom, the teacher explains a concept, then students practice similar problems. In Exeter's Mathematics 2, students must derive concepts from problems themselves, often without any prior explanation.
- **Emphasis on Process Over Answers:** Many Exeter math problems have multiple correct approaches. The grade is not based on getting the right answer quickly but on the quality of reasoning and participation in discussion.
- **Steep Difficulty Curve:** The problems in Mathematics 2 are significantly more challenging than those in a standard Algebra 2 or Geometry course. They require sustained effort and often take 30–60 minutes per problem set.
- **Collaboration Encouraged:** While individual work is expected, students are actively encouraged to collaborate outside of class. Study groups are the norm, and students learn to articulate their thinking to peers.
- **Little Repetition:** Exeter problems are designed to test understanding, not rote skill. There are no "drill and kill" worksheets. Once a concept is mastered, it is not revisited in the same form.

These differences mean that a student who excelled in a traditional math environment may initially struggle in Mathematics 2. However, the struggle is deliberate. Exeter believes that true learning occurs when students are pushed beyond their comfort zone and learn to rely on their own intellectual resources.

WHO SHOULD TAKE MATHEMATICS 2 AT PHILLIPS EXETER ACADEMY?

Mathematics 2 is typically taken after completing Mathematics 1, which covers material roughly equivalent to an integrated Algebra 1 and Geometry course. Students entering Exeter from other schools often take a placement test to determine the appropriate starting point. Because the pace and depth are demanding, the course is best suited for students who have strong foundational skills and a willingness to engage in active, collaborative learning.

It is important to note that **Mathematics 2 Phillips Exeter Academy** is not just for math prodigies. Many students who consider themselves average in math have thrived in the course by embracing the Harkness method. What matters more than raw talent is intellectual curiosity and resilience. Students who are comfortable with ambiguity and enjoy puzzles tend to flourish.

BENEFITS OF EXETER'S MATHEMATICS 2

The impact of taking Mathematics 2 at Phillips Exeter Academy extends far beyond the classroom. Here are some of the key benefits reported by students and alumni:

- **Critical Thinking Skills:** Exeter's problem-based approach teaches students to approach unfamiliar problems with confidence. They learn to break down complex questions into manageable parts, a skill invaluable in any field.
- **Collaboration and Communication:** Regular participation in Harkness discussions sharpens students' ability to explain their reasoning clearly and to listen to and critique others' ideas constructively.
- **Preparation for College and Beyond:** Many alumni note that their Exeter math experience made college-level mathematics (including calculus and linear algebra) feel significantly easier. The discipline of independent discovery builds self-reliance.
- **Love for Mathematics:** By focusing on exploration rather than memorization, Mathematics 2 often ignites a genuine passion for the subject. Students start to see math as a creative, beautiful discipline rather than a set of rules.
- **Resilience and Grit:** The course is hard. Students learn to persist through confusion and frustration. This resilience is a life lesson that transcends mathematics.

RESOURCES AND SUPPORT FOR MATHEMATICS 2 STUDENTS

Given the demanding nature of the course, Exeter provides multiple layers of support for students enrolled in Mathematics 2. The most important resource is the Harkness table itself—peers become teachers. Additionally, the math department hosts evening help sessions where students can work on problem sets with a teacher present. Many students form informal study groups in dormitories or common areas.

For those seeking external practice, the Exeter Mathematics 2 textbook problems are widely available online (with permission). Numerous websites and forums, such as the Exeter Math Club or various homeschooling communities, offer discussions of solutions. However, Exeter strongly emphasizes that looking up answers should be a last resort; the real learning comes from wrestling with the problem independently.

Parents and guardians often wonder how to support a student in Mathematics 2. The best advice is to encourage perseverance and to resist the urge to provide answers. Instead, ask guiding questions: "What patterns do you see?" or "Can you draw a diagram?" The goal is to help the student build internal problem-solving strategies.

CONCLUSION

Mathematics 2 Phillips Exeter Academy is far more than a course—it is an immersive experience in mathematical thinking. By abandoning traditional lectures and placing students in the driver's seat of their own learning, Exeter has crafted a curriculum that cultivates deep understanding, intellectual bravery, and a lasting appreciation for the art of problem-solving. Whether you are a prospective student, a parent, or an educator looking for innovative teaching models, the lessons embedded in Mathematics 2 extend well beyond the walls of Exeter. They speak to a fundamental truth about education: the best learning happens not when we are told the answers, but when we are empowered to discover them ourselves. If you have the opportunity to embark on this journey, embrace the challenge. The rewards are immeasurable.