The Interactive Mathematics Program (IMP) is a comprehensive, problem-based mathematics curriculum that integrates traditional content, such as algebra, geometry, and trigonometry, with other academic and real-world problem-solving experiences. The program prepares students to use mathematics and problem-solving skills in further education and on the job.

The curriculum is designed to help all students develop a deep understanding of mathematical concepts and how to apply them. It challenges students to explore open-ended situations actively, in a way that encourages them to see the many ways that a variety of ideas relate to each other. Graphing calculators are used in all units to enhance student understanding.

The Interactive Mathematics Program elaborates concepts through all four years. Each year of the program covers fewer topics than traditional programs, but covers them in greater depth. A strength of IMP is the opportunity provided to students to build understanding of mathematics as they work on fairly unstructured problems.

Assessment is an integral part of IMP. Students are provided diverse ways to demonstrate understanding, including homework, portfolios, presentations, reinforcement and extension problems, unit and semester exams, and discussion.

The student should be able to:

From Algebra
- Solve quadratic equations by factoring
- Study the number of roots of a quadratic equation and relating this number to the graph of the associated quadratic function
- Use the method of completing the square to solve quadratic equations
- Work with exponential and logarithmic functions:
  - Describing their graphs
  - Understanding the relationship between logarithms and exponents
  - Finding that the derivative of an exponential function is proportional to the value of the function
  - Sketching their graphs
- Develop and use the elimination method for solving systems of linear equations
- Approximate the value of a derivative at a given point
- Understand the meaning of the derivative of a function at a point and its relationship to other functions
- Find the distance from a point to a line
- Develop and apply various formulas from coordinate geometry, including:
  - The equation of a circle with arbitrary center and radius
  - The distance formula
  - The midpoint formula
From Geometry
- Develop and work with equations of planes in three-dimensional coordinates
- Find the distance from a point to a line
- Develop and apply various formulas from coordinate geometry, including:
  - The distance formula
  - The midpoint formula
  - The equation of a circle with arbitrary center and radius
From Analytic and Coordinate Geometry
- Develop and work with equations of planes in three-dimensional coordinates
- Find the distance from a point to a line
- Develop and apply various formulas from coordinate geometry, including:
  - The distance formula
  - The midpoint formula
  - The equation of a circle with arbitrary center and radius
From Precalculus
- Understand and use inverse functions
- Understand and use inverse functions
- Develop and work with equations of planes in three-dimensional coordinates
- Find the distance from a point to a line
- Develop and apply various formulas from coordinate geometry, including:
  - The distance formula
  - The midpoint formula
  - The equation of a circle with arbitrary center and radius
From Geometry
- Develop and work with equations of planes in three-dimensional coordinates
- Find the distance from a point to a line
- Develop and apply various formulas from coordinate geometry, including:
  - The distance formula
  - The midpoint formula
  - The equation of a circle with arbitrary center and radius
From Trigonometry
- Apply right triangle trigonometry to real-world situations
From Probability and Statistics
- Develop and apply principles for finding the probability for a sequence of events
- Develop methods for the systematic listing of possibilities for complex problems
- Develop the meaning of combinatorial and permutation coefficients in the context of real-world situations, and understand the distinction between combinations and permutations
- Develop the mean of combinatorial and permutation coefficients in the context of real-world situations, and understand the distinction between combinations and permutations

From Logic
- Use "if and only if" in describing sets of points fitting given criteria
- Define and use the concept of the converse of a statement
- Use "it and only if" in describing sets of points fitting given criteria
- Develop and apply the binomial distribution
- Understand and use Pascal's triangle

Number Systems (IM 3) A•, C•, Problem-Solving & Reasoning (IM 3) A•, C•: Applications & Connections (IM 3) A•: Communicating

PA STANDARDS: 2.1, 2.2, 2.7, 2.8, 2.9, 2.10, 2.11