

# A Mathematics Manifesto - Curriculum at a Glance

**Themes and Core Concepts**

- Algebra**
  - Linear Equations and Functions:** Understanding the relationship between variables, solving systems of equations, and graphing linear functions.
  - Quadratic Equations and Functions:** Solving quadratic equations, understanding the properties of parabolas, and graphing quadratic functions.
  - Polynomial Equations and Functions:** Factoring polynomials, solving polynomial equations, and graphing polynomial functions.
  - Rational Equations and Functions:** Solving rational equations, understanding the properties of rational functions, and graphing rational functions.
- Geometry**
  - Area and Perimeter:** Calculating the area and perimeter of various shapes, understanding the relationship between area and perimeter, and applying these concepts to real-world problems.
  - Volume and Surface Area:** Calculating the volume and surface area of three-dimensional figures, understanding the relationship between volume and surface area, and applying these concepts to real-world problems.
  - Similar Figures and Solids:** Understanding the properties of similar figures and solids, applying the concept of similarity to solve problems, and understanding the relationship between area and volume.
- Trigonometry**
  - Right Triangles:** Understanding the properties of right triangles, solving right triangles, and applying trigonometry to solve problems.
  - Trigonometric Functions:** Understanding the properties of trigonometric functions, graphing trigonometric functions, and applying trigonometry to solve problems.

**Abstract Algebra and Operator Theory**

- Group Theory:** Understanding the properties of groups, solving group problems, and applying group theory to solve problems.
- Ring Theory:** Understanding the properties of rings, solving ring problems, and applying ring theory to solve problems.
- Field Theory:** Understanding the properties of fields, solving field problems, and applying field theory to solve problems.
- Operator Theory:** Understanding the properties of operators, solving operator problems, and applying operator theory to solve problems.

**Calculus and Analysis**

- Limits and Continuity:** Understanding the concept of limits, solving limit problems, and applying limits to solve problems.
- Derivatives:** Understanding the concept of derivatives, solving derivative problems, and applying derivatives to solve problems.
- Integrals:** Understanding the concept of integrals, solving integral problems, and applying integrals to solve problems.
- Differential Equations:** Understanding the properties of differential equations, solving differential equations, and applying differential equations to solve problems.

**Graph Theory and Network Science**

- Graph Theory:** Understanding the properties of graphs, solving graph problems, and applying graph theory to solve problems.
- Network Science:** Understanding the properties of networks, solving network problems, and applying network science to solve problems.

**Nonlinear Dynamics and Chaos Theory**

- Nonlinear Dynamics:** Understanding the properties of nonlinear systems, solving nonlinear problems, and applying nonlinear dynamics to solve problems.
- Chaos Theory:** Understanding the properties of chaotic systems, solving chaotic problems, and applying chaos theory to solve problems.

**Mathematical Logic and Computability Theory**

- Mathematical Logic:** Understanding the properties of logic, solving logic problems, and applying logic to solve problems.
- Computability Theory:** Understanding the properties of computability, solving computability problems, and applying computability theory to solve problems.

**Mathematical Statistics**

- Probability:** Understanding the properties of probability, solving probability problems, and applying probability to solve problems.
- Statistics:** Understanding the properties of statistics, solving statistics problems, and applying statistics to solve problems.

**Discrete Mathematics**

- Combinatorics:** Understanding the properties of combinatorics, solving combinatorics problems, and applying combinatorics to solve problems.
- Graph Theory:** Understanding the properties of graphs, solving graph problems, and applying graph theory to solve problems.
- Number Theory:** Understanding the properties of number theory, solving number theory problems, and applying number theory to solve problems.
- Algebraic Combinatorics:** Understanding the properties of algebraic combinatorics, solving algebraic combinatorics problems, and applying algebraic combinatorics to solve problems.

**Mathematical Physics**

- Classical Mechanics:** Understanding the properties of classical mechanics, solving classical mechanics problems, and applying classical mechanics to solve problems.
- Quantum Mechanics:** Understanding the properties of quantum mechanics, solving quantum mechanics problems, and applying quantum mechanics to solve problems.
- Relativity:** Understanding the properties of relativity, solving relativity problems, and applying relativity to solve problems.

**Mathematical Biology**

- Population Dynamics:** Understanding the properties of population dynamics, solving population dynamics problems, and applying population dynamics to solve problems.
- Ecology:** Understanding the properties of ecology, solving ecology problems, and applying ecology to solve problems.
- Evolutionary Biology:** Understanding the properties of evolutionary biology, solving evolutionary biology problems, and applying evolutionary biology to solve problems.

**Mathematical Economics**

- Game Theory:** Understanding the properties of game theory, solving game theory problems, and applying game theory to solve problems.
- Microeconomics:** Understanding the properties of microeconomics, solving microeconomics problems, and applying microeconomics to solve problems.
- Macroeconomics:** Understanding the properties of macroeconomics, solving macroeconomics problems, and applying macroeconomics to solve problems.

**Mathematical Engineering**

- Structural Analysis:** Understanding the properties of structural analysis, solving structural analysis problems, and applying structural analysis to solve problems.
- Fluid Dynamics:** Understanding the properties of fluid dynamics, solving fluid dynamics problems, and applying fluid dynamics to solve problems.
- Thermodynamics:** Understanding the properties of thermodynamics, solving thermodynamics problems, and applying thermodynamics to solve problems.

**Mathematical Finance**

- Probability and Statistics:** Understanding the properties of probability and statistics, solving probability and statistics problems, and applying probability and statistics to solve problems.
- Optimization:** Understanding the properties of optimization, solving optimization problems, and applying optimization to solve problems.
- Financial Mathematics:** Understanding the properties of financial mathematics, solving financial mathematics problems, and applying financial mathematics to solve problems.

**Mathematical Computing**

- Algorithm Design:** Understanding the properties of algorithm design, solving algorithm design problems, and applying algorithm design to solve problems.
- Complexity Theory:** Understanding the properties of complexity theory, solving complexity theory problems, and applying complexity theory to solve problems.
- Computational Geometry:** Understanding the properties of computational geometry, solving computational geometry problems, and applying computational geometry to solve problems.

**Mathematical Cryptography**

- Cryptography:** Understanding the properties of cryptography, solving cryptography problems, and applying cryptography to solve problems.

**Mathematical Linguistics**

- Linguistics:** Understanding the properties of linguistics, solving linguistics problems, and applying linguistics to solve problems.

**Mathematical Psychology**

- Psychology:** Understanding the properties of psychology, solving psychology problems, and applying psychology to solve problems.

**Mathematical Philosophy**

- Philosophy of Mathematics:** Understanding the properties of the philosophy of mathematics, solving philosophy of mathematics problems, and applying philosophy of mathematics to solve problems.

**Mathematical History**

- History of Mathematics:** Understanding the properties of the history of mathematics, solving history of mathematics problems, and applying history of mathematics to solve problems.

**Mathematical Art**

- Mathematical Art:** Understanding the properties of mathematical art, solving mathematical art problems, and applying mathematical art to solve problems.

**Mathematical Education**

- Mathematical Education:** Understanding the properties of mathematical education, solving mathematical education problems, and applying mathematical education to solve problems.

**Mathematical Literature**

- Mathematical Literature:** Understanding the properties of mathematical literature, solving mathematical literature problems, and applying mathematical literature to solve problems.

**Mathematical Culture**

- Mathematical Culture:** Understanding the properties of mathematical culture, solving mathematical culture problems, and applying mathematical culture to solve problems.

**Mathematical Society**

- Mathematical Society:** Understanding the properties of mathematical society, solving mathematical society problems, and applying mathematical society to solve problems.

**Mathematical Community**

- Mathematical Community:** Understanding the properties of mathematical community, solving mathematical community problems, and applying mathematical community to solve problems.

**Mathematical Future**

- Mathematical Future:** Understanding the properties of mathematical future, solving mathematical future problems, and applying mathematical future to solve problems.

**Mathematical Vision**

- Mathematical Vision:** Understanding the properties of mathematical vision, solving mathematical vision problems, and applying mathematical vision to solve problems.

**Mathematical Inspiration**

- Mathematical Inspiration:** Understanding the properties of mathematical inspiration, solving mathematical inspiration problems, and applying mathematical inspiration to solve problems.

**Mathematical Creativity**

- Mathematical Creativity:** Understanding the properties of mathematical creativity, solving mathematical creativity problems, and applying mathematical creativity to solve problems.

**Mathematical Innovation**

- Mathematical Innovation:** Understanding the properties of mathematical innovation, solving mathematical innovation problems, and applying mathematical innovation to solve problems.

**Mathematical Progress**

- Mathematical Progress:** Understanding the properties of mathematical progress, solving mathematical progress problems, and applying mathematical progress to solve problems.

**Mathematical Achievement**

- Mathematical Achievement:** Understanding the properties of mathematical achievement, solving mathematical achievement problems, and applying mathematical achievement to solve problems.