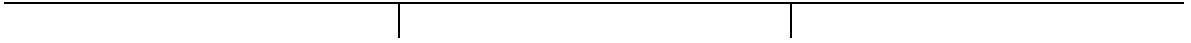


# K-12 Mathematics Benchmarks

By the end of the 11-12 program:

Number, Number Sense and Operations	Measurement	Geometry and Spatial Sense
<p>A. Demonstrate that vectors and matrices are systems having some of the same properties of the real number system.</p> <p>B. Develop an understanding of properties of and representations for addition and multiplication of vectors and matrices.</p> <p>C. Apply factorials and exponents, including fractional exponents, to solve practical problems.</p> <p>D. Demonstrate fluency in operations with real numbers, vectors and matrices, using mental computation or paper and pencil calculations for simple cases and technology for more complicated cases.</p> <p>E. Represent and compute with complex numbers.</p>	<p>A. Explain differences among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations.</p> <p>B. Apply various measurement scales to describe phenomena and solve problems.</p> <p>C. Estimate and compute areas and volume in increasingly complex problem situations.</p> <p>D. Solve problem situations involving derived measurements; e.g., density, acceleration.</p>	<p>A. Use trigonometric relationships to verify and determine solutions in problem situations.</p> <p>B. Represent transformations within a coordinate system using vectors and matrices.</p>



# K-12 Mathematics Benchmarks

By the end of the 11-12 program:

Patterns, Functions and Algebra	Data Analysis and Probability	Mathematical Processes
<p>A. Analyze functions by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior.</p> <p>B. Use the quadratic formula to solve quadratic equations that have complex roots.</p> <p>C. Use recursive functions to model and solve problems; e.g., home mortgages, annuities.</p> <p>D. Apply algebraic methods to represent and generalize problem situations involving vectors and matrices.</p>	<p>A. Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.</p> <p>B. Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability.</p> <p>C. Design and perform a statistical experiment, simulation or study; collect and interpret data; and use descriptive statistics to communicate and support predictions and conclusions.</p> <p>D. Connect statistical techniques to applications in workplace and consumer situations.</p>	<p>A. Construct algorithms for multi-step and non-routine problems.</p> <p>B. Construct logical verifications or counter-examples to test conjectures and to justify or refute algorithms and solutions to problems.</p> <p>C. Assess the adequacy and reliability of information available to solve a problem.</p> <p>D. Select and use various types of reasoning and methods of proof.</p> <p>E. Evaluate a mathematical argument and use reasoning and logic to judge its validity.</p> <p>F. Present complete and convincing arguments and justifications, using inductive and deductive reasoning, adapted to be effective for various audiences.</p> <p>F. Understand the difference between a statement that is verified by mathematical proof, such as a theorem, and one that is verified empirically using examples or data.</p>



# K-12 Mathematics Benchmarks

By the end of the 11-12 program:

Patterns, Functions and Algebra	Data Analysis and Probability	Mathematical Processes
		<p>G. Use formal mathematical language and notation to represent ideas, to demonstrate relationships within and among representation systems, and to formulate generalizations.</p> <p>I. Communicate mathematical ideas orally and in writing with a clear purpose and appropriate for a specific audience.</p> <p>J. Apply mathematical modeling to workplace and consumer situations, including problem formulation, identification of a mathematical model, interpretation of solution within the model, and validation to original problem situation.</p>