

Mission Statement: It is the mission of the Elba Central School District to actualize the phrase “Elba Equals Educational Excellence for Everyone.” We are committed to providing both quality and equity. Every student will have the opportunity to develop to the best of his/her ability.

Elba Standards: In addition to the knowledge and basic skills they need in order to participate in society, graduates of Elba Central School will develop:

1. Empowering skills: decision making, goal setting, creative thinking and problem solving abilities;
2. Communication and social interaction skills;
3. Technological literacy;
4. Total wellness (social, physical, emotional health and self-esteem);
5. The values necessary to participate in society.

As a result of achieving these outcomes, our students will embrace lifelong learning.

New York State Standards and Performance Indicators (Description of the levels of student achievement pertaining to standard):

Standard 3 - *Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry;* but also the seven key ideas.

1. Mathematical Reasoning

- a) construct indirect proofs or proofs using mathematical induction
- b) investigate and compare the axiomatic structures of various geometries

2. Numbers and Numeration

- a) understand the concept of infinity.
- b) recognize the hierarchy of the complex number system.
- c) model the structure of the complex number system.
- d) recognize when to use and how to apply the field properties.

3. Operations

- a) use appropriate techniques, including graphing utilities, to perform basic operations on matrices.
- b) use rational exponents on real numbers and all operations on complex numbers.
- c) combine functions using the basic operations and the composition of two functions.

4. Modeling/Multiple Representation

- a) model vector quantities both algebraically and geometrically
- b) represent graphically the sum and difference of two complex numbers
- c) model and solve problems that involve absolute value, vectors, and matrices
- d) model quadratic inequalities both algebraically and graphically
- e) model the composition of transformations
- f) determine the effects of changing parameters of the graphs of functions
- g) use polynomial, rational, trigonometric, and exponential functions to model real-world relationships
- h) use algebraic relationships to analyze the conic sections
- i) use circular functions to study and model periodic real-world phenomena
- j) illustrate spatial relationships using perspective, projections, and maps
- k) represent problem situations using discrete structures such as finite graphs, matrices, sequences, and recurrence relations.
- l) analyze spatial relationships using the Cartesian coordinate system in three dimensions.

5. Measurement

- a) derive and apply formulas relating angle measure and arc degree measure in a circle
- b) apply theorems related to lengths of segments in a circle

- c) define the trigonometric functions in terms of the unit circle
- d) relate trigonometric relationships to the area of a triangle and to the general solutions of triangles
- e) apply the normal curve and its properties to familiar contexts
- f) design a statistical experiment to study a problem and communicate the outcomes, including dispersion
- g) use statistical methods to make predictions
- h) apply the conceptual foundation of limits, infinite sequences and series, the area under a curve, rate of change, inverse variation, and the slope of a tangent line to authentic problems in mathematics and other disciplines
- i) determine optimization points on a graph
- j) use derivatives to find maximum, minimum, and inflection points of a function

6. Uncertainty

- a) interpret probabilities in real-world situations
- b) judge the reasonableness of a graph produced by a calculator or computer
- c) use a Bernoulli experiment to determine probabilities for experiments with exactly two outcomes
- d) use curve fitting to predict from data
- e) apply the concept of random variable to generate and interpret probability distributions
- f) create and interpret applications of discrete and continuous probability distributions
- g) make predictions based on interpolations and extrapolations from data
- h) obtain confidence intervals and test hypotheses using appropriate statistical methods
- i) approximate the roots of polynomial equations

7. Patterns/Functions

- a) solve equations with complex roots
- b) understand and apply the relationship between the rectangular and polar forms of a complex number
- c) evaluate and form the composition of functions
- d) use the definition of a derivative to examine the properties of a function
- e) solve equations involving fractions, absolute values, and radicals
- f) use basic transformations to demonstrate similarity and congruence of figures
- g) identify and differentiate between direct and indirect isometries
- h) analyze inverse functions using transformations
- i) apply the ideas of symmetries in sketching and analyzing graphs of functions
- j) use the normal curve to answer questions about data
- k) develop methods to solve trigonometric equations and verify trigonometric functions
- l) describe patterns produced by processes of geometric change, formally connecting iteration, approximations, limits, and fractals
- m) extend patterns and compute the n th term in numerical and geometric sequences
- n) use the limiting process to analyze infinite sequences and series
- o) use algebraic and geometric iteration to explore problems and solve problems
- p) solve optimization problems
- q) use linear programming and difference equations in the solution of problems

Standard 6—Interconnectedness: Common Themes. Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.

The Key Ideas for Standard Six are

1. Systems Thinking—Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.
2. Models—Models are simplified representations of objects, structure, or systems used in analysis, explanation, interpretation, or design.
3. Magnitude and Scale—The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems.
4. Equilibrium and Stability—Equilibrium is a state of stability due either to a lack of changes (static equilibrium) or a balance between opposing forces (dynamic equilibrium).
5. Patterns of Change—Identifying patterns of change is necessary for making predictions about future behavior and conditions.
6. Optimization—In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs.

National Standards: National Standards (published by the National Council of Teachers of Mathematics) are directly in line with our state standards and can be found at NCTM.ORG.

| Assessment: | Acceptable Performance Level |
|--------------------|-------------------------------------|
| Local Exam | 70% |
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Scope: Topics covered are aligned under the 7 key ideas published by the state.

Sequence:

- Linear and Quadratic Functions
- Polynomial Functions
- Inequalities
- Functions

- Exponential and Logarithms
- Analytic Geometry
- Trigonometric Functions
- Trigonometric Equations and Applications
- Vectors and Determinants
- Sequences and Series
- Matrices
- Pre-Calculus

Methodology:

- Incorporation of Six-Traits as a method of assessing short and extended open response question, focusing on the traits of Ideas and Organization.
- Employment of Graphing and Scientific Calculators.
- Provide students opportunities for learning in a variety of situations by employing Cooperative Learning Strategies and Short/Long Term Projects.